# Integra32™

***Integrated Alarm Monitoring***

***and Access Control***

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***HARDWARE MANUAL***

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### *FCC*

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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# Chapter 1
# Introducing Integra32™

The **Integra32**™ system from RBH Access Technologies Inc. represents the latest in access technology specifically designed for smaller applications. Its intuitive graphical interface allows users to take advantage of the power of the **Integra32**™ with a minimal amount of training.

The **IRC-2000** Intelligent Field Panels utilize flash firmware for easy upgrades. The **IRC-2000** panel uses fully distributed intelligence for off-line operations. In addition to supporting two card readers, each **IRC-2000** Intelligent Field Panel also has eight fully supervised alarm inputs along with eight outputs (*four dry contact outputs and four open collector outputs*). The IRC2000's memory has been increased to now hold 5,000 cards and can be further extended to hold 8,000 cards.

An alternate panel the **URC-2000** can be used along with or instead of the original **IRC-2000**. This panel also uses fully distributed intelligence for off-line operations. In addition to supporting two card readers, each **URC-2000** panel has four fully supervised alarm inputs and four outputs as well as a 3,000 card capacity. Communication is handle through an RS485 port.

The PC is used for data entry, setting up the database, and monitoring activity on the system. Once the database is downloaded to the controllers, the PC is not required for system operation. Should the PC be powered down, the controller will perform all access and other control functions (but of course not Global functions), including logging history events. When the connection is restored, the log will then be reported to the PC.

Up to thirty-two panels can be connected together, for a maximum capacity of sixty-four doors. Connect the PC to the first control directly via RS232 or by an IP address (*using an existing Ethernet*). Additional controls can be connected to the first control with RS485 (*maximum total wiring distance is four thousand feet*) to a maximum of sixteen panels per connection (*or network*).

Interfacing with intrusion alarm panels has been made possible. Connect to Bosch or Summit panels through the **PC-100** board.

Elevator control is accomplished with a modified URC2000 panel and ELC-08 relay boards. Four relay boards can control up to thirty-two floors for two readers.

Other features include the capacity for forty holidays, one hundred and twenty-eight time zones, as well as handicap access by cardholder. High security and lock/unlock modes are also supported. Each panel can have up to sixty-four input/output links, and the system is capable of holding two hundred and fifty-five pre-programmed operator commands. Both local and timed Antipassback are also supported.

# Chapter 2
# Intelligent Field Panel

The Integra32™ access control system consists of one or more controllers. All information required by the controller is downloaded from the PC and stored locally in flash memory. This information includes configuration data, cardholder records, access levels, schedules, and all other records necessary for the operation of the system. The controller operates independent of the PC and all decision-making is performed locally, even in the event of total power loss (*while operating on battery backup*).

## IRC2000

### Connection Details

#### *Power*

The IRC-2000 requires 9 to 14 volts DC and draws about 250ma.

#### *PC/ Modem Interface*

The PC/Modem interface connects the IRC-2000 to a PC or modem through an RS232, TCP/IP Ethernet, or an RS485 (*2-wire*) interface.

#### *Inputs*

There are two common terminals for each set of four inputs (*one between inputs one and two, another between three and four, one between five and six, and one between seven and eight*). Seven different input types are supported (*including normally open, normally closed, one resistor, and two resistor configurations*).

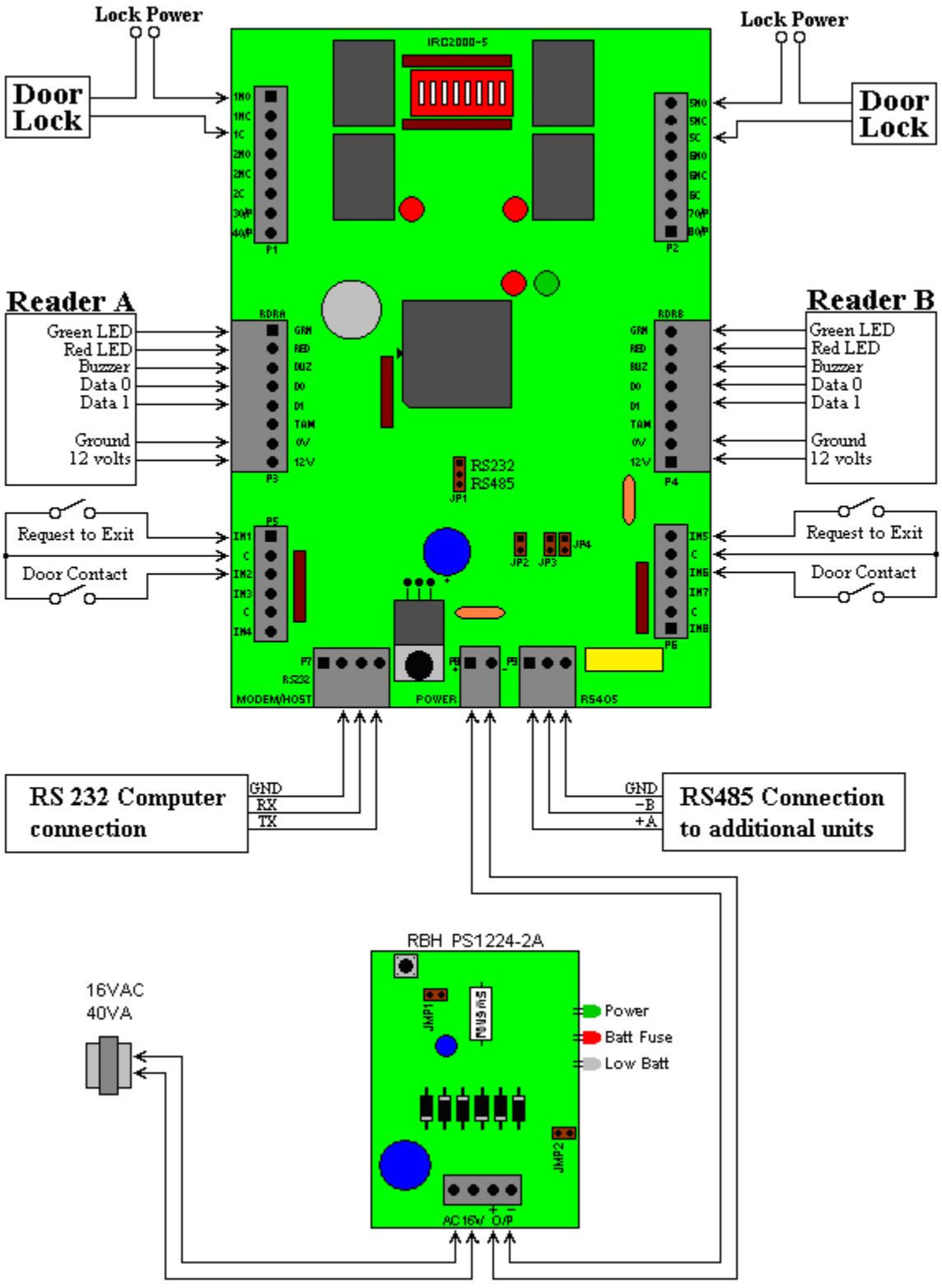
#### *Outputs*

Four of the eight programmable outputs are dry contact relays (*UL rated 2A @ 30v dc*). These are designated as outputs one, two, five, and six. The other four outputs are solid-state switches (*open collector to ground capable of sinking 100ma*).

#### *Readers*

Readers are connected to non-programmable outputs BUZ, RED, & GRN, as well as data inputs D0 and D1. Both readers have their own connection terminals, reader A on the left side of the board and reader B on the right.

# IRC2000 Wiring Diagram

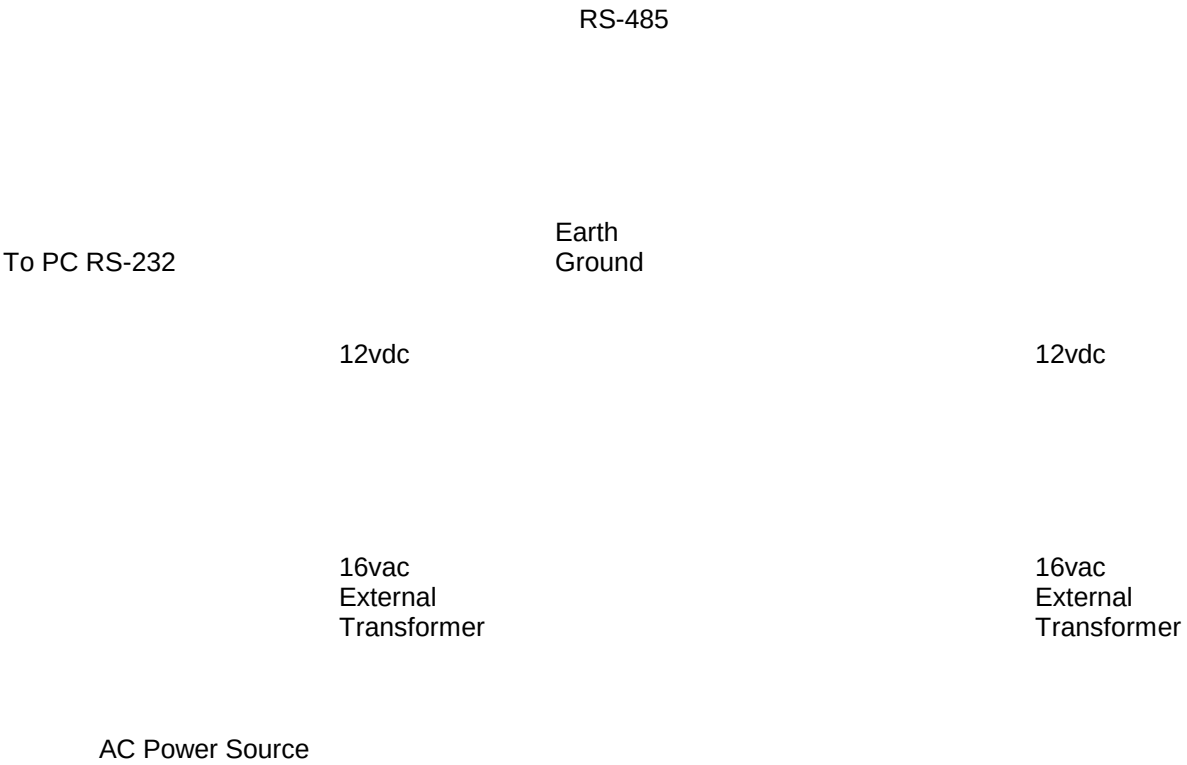


## Earth

The controller contains several layers of protection against induced high voltage transients from static discharge, lightning, and power line spikes. In order for this protection to be fully effective, a good connection to earth ground is essential. Wire this connection to a metal cold water pipe or similar structure. Do not connect directly to the AC earth. Use 16 AWG or heavier cable and keep the length as short as possible (*less than 50 feet [15 meters]*).

For multiple panels always use only a single point ground reference for all panels. Bring the shields of all reader and communication cables back to one location. Do not connect them to the panel or the panel's housing.

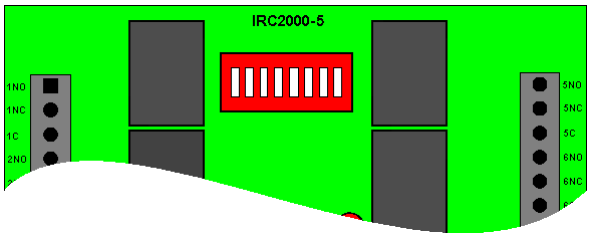
## *Grounding the Integra32 system*



## DIP Switch Settings

The IRC-2000's DIP switches control a number of operating parameters including the device address and serial port baud rate. The controller must be powered down to accept any changes in the DIP switch settings. Use DIP switches one through five to set the controller address. Switches six and seven set the communication baud rate, and switch eight is used to set the connection type (*modem or direct).*

| DIP Switch | |
|---|---|
| **DIP Switch** | **Function** |
| 1 - 5 | Controller Address |
| 6,7 | Controller Baud Rate |
| 8 | Modem/Direct PC Connection |




### *Controller Addressing*

Use DIP switches 1, 2, 3, 4, and 5 to select the controller address. The address is binary coded and the switch settings for all sixteen possible addresses are given below.

| Controller Addressing | | | | | |
|---|---|---|---|---|---|
| **Switch 1** | **Switch 2** | **Switch 3** | **Switch 4** | **Switch 5** | **Address** |
| On | Off | Off | Off | Off | 1 |
| Off | On | Off | Off | Off | 2 |
| On | On | Off | Off | Off | 3 |
| Off | Off | On | Off | Off | 4 |
| On | Off | On | Off | Off | 5 |
| Off | On | On | Off | Off | 6 |
| On | On | On | Off | Off | 7 |
| Off | Off | Off | On | Off | 8 |
| On | Off | Off | On | Off | 9 |
| Off | On | Off | On | Off | 10 |
| On | On | Off | On | Off | 11 |

| | | | | | |
|---|---|---|---|---|---|
| Off | Off | On | On | Off | 12 |
| On | Off | On | On | Off | 13 |
| Off | On | On | On | Off | 14 |
| On | On | On | On | Off | 15 |
| Off | Off | Off | Off | On | 16 |

## *Direct Connect/Modem Selection*

DIP switch 8 specifies whether the IRC-2000 is connected directly to a serial port on the PC or communicates with the PC over a modem. Contact the RBH tech support office for information on the optional TCP/IP Ethernet connection.

| **Direct Connect / Modem Selection** | |
|---|---|
| **DIP Switch 8** | **Interface Type** |
| OFF | Direct Connect To PC |
| ON | Modem |

DIP switch 8 specifically turns on the password requirement and enables modem call-back. The panel will still answer a modem call with DIP switch 8 off. You should initially set up the panel with DIP switch 8 off, program the panel and download to it. Then turn DIP switch 8 on to enable password checking.

## *Computer/Modem Port Baud Rate Selection*

The controller's serial port baud rate is set with controller DIP switches 6 and 7. This setting determines the speed used to communicate with the modem or PC serial port. If the controller is connected directly to the PC, the controller baud rate must be the same as the baud rate set for the port on the PC. The default PC baud rate is 38,400.

| **Controller Baud Rate Selection** | | |
|---|---|---|
| **DIP Switch 6** | **DIP Switch 7** | **Baud Rate** |
| OFF | OFF | 9,600 |
| ON | OFF | 28,800 |
| OFF | ON | 38,400 |
| ON | ON | 56,000 |

# PC Connections

## *RS232 Connection*

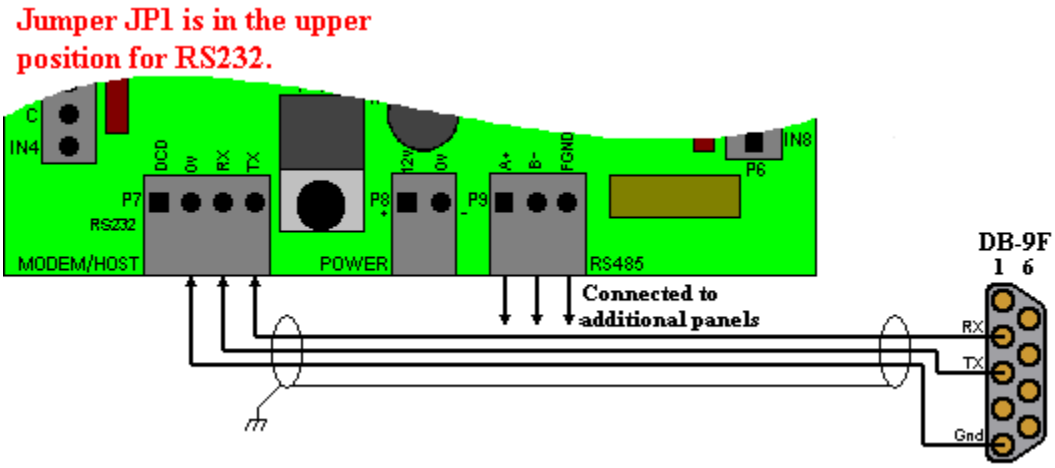
The PC serial port used to connect to the IRC-2000 panels is assigned under the Communication Port Setup screen of Network properties window in the **Integra32**™ software. The baud rate is set by default to 9600 for direct connection to the PC using the standard RS232 interface. The RS232 interface can be used to connect to a single controller or to the first controller of a network. The distance between the PC and controller can not be greater than 150 feet (*45 meters*), or 30 feet (*9 meters*) if the baud rate is increased to 38,400.

For distances greater than 150 feet (45 *meters*), an RS485 interface must be used. RS485 is built into the IRC-2000 controller but is not part of the standard PC. The PC must be fitted with either an RS485 serial card or an external RS232 to RS485 serial port converter.

Additional controllers can be connected via the RS485 terminals.

| Controller to PC Connection (RS232) | | |
|---|---|---|
| **Controller** | **DB9 Connector** | **DB25 Connector** |
| GND | Pin 5 | Pin 7 |
| TX | Pin 3 | Pin 2 |
| RX | Pin 2 | Pin 3 |

**PC to IRC-2000 - RS232 Interface Wiring**




## *Cable Specification*

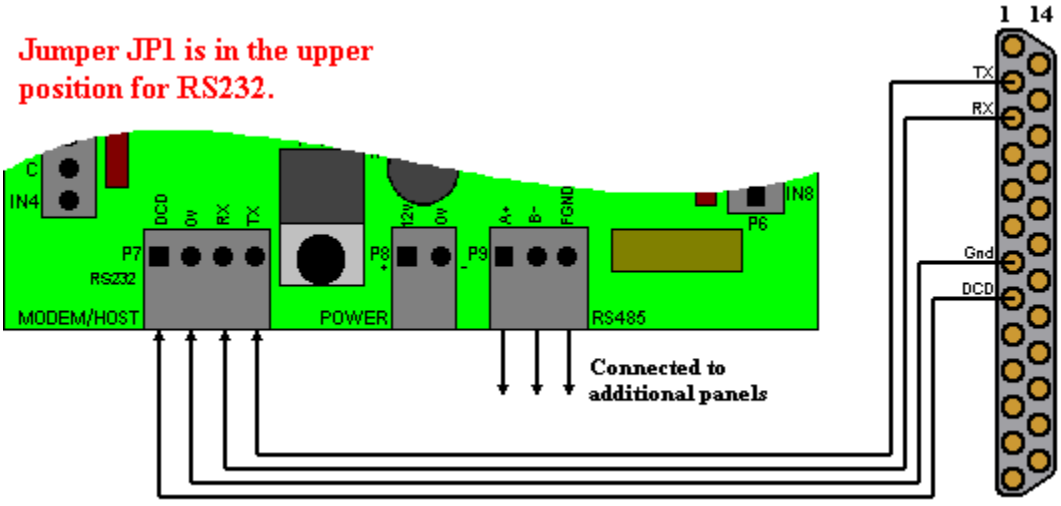
3 or 4-conductor shielded, 18 to 22 AWG

## *Maximum Cable Length*

| | |
|---|---|
| 9600 baud | 150 feet (45 meters) |
| 56000 baud | 50 feet (15 meters) |

## *Modem Connection*

The IRC-2000 can be connected to the PC via a modem. The modem connection is similar to the RS-232 connect with the inclusion of the DCD terminal. If multiple controllers are used then the RS-485 connecter will be needed to connect the additional controllers to the modem controller.




### *Cable Specification*

4-conductor shielded, 18 to 22 AWG

### *Maximum Cable Length*

| | |
|---|---|
| 9600 baud | 150 feet (45 meters) |
| 56000 baud | 50 feet (15 meters) |

## *TCP/IP Connection*

For TCP/IP connections, wire to the TCP/IP interface as you would to the PC, with a direct RS-232 connection. The TCP/IP interface is programmed with an IP address and connected to the LAN (*contact the local system administrator for an IP address*).

Additional controllers can be connected via the RS-485 connection terminals.

## *RS485 Connection*

The IRC-2000 controller supports a two-wire RS485 interface. Jumpers JP1 is to be set on the lower two pins for RS485 operation.

The RS485 interface allows the distance between the controller and the PC to be extended up to 4000 feet (*1200 meters*). RS485 requires one twisted pair shielded cable.

### *Cable Specification*

Single twisted three-conductor, shielded, 18 to 22 AWG

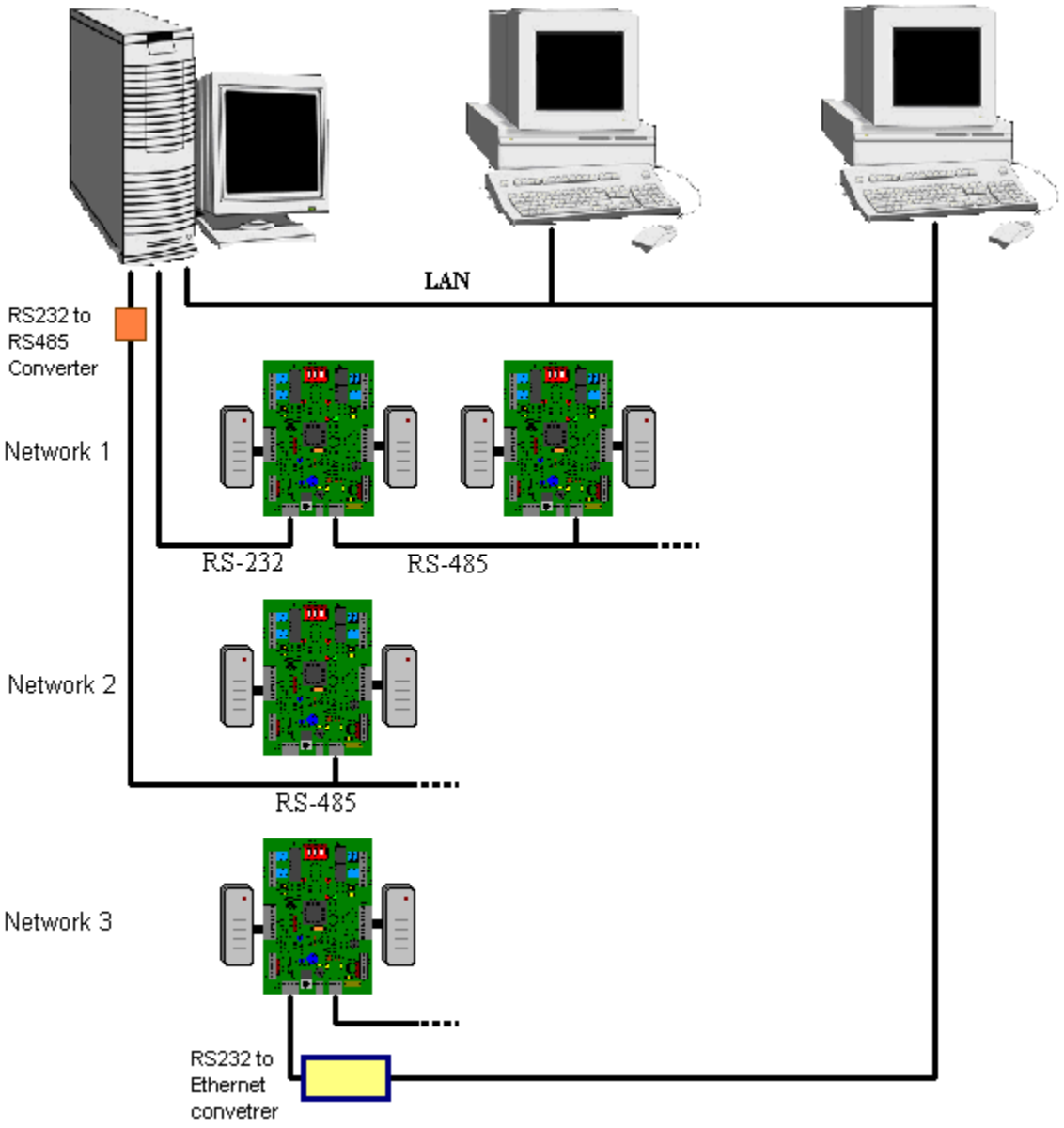
### *Maximum Cable Length*

4000 feet (1200 meters)

## Controller Networks

Up to thirty-two controllers can be connected to a single PC. They can be connected to the same network or distributed across multiple networks. After the first controller of the network is connected to the PC, additional controllers can be connected to the network via the RS485 terminals. Connect the TX/A terminal of one controller to the TX/A terminal next one, and connect the RX/B terminal to the RX/B terminal. All of the controllers on a network are connected in parallel.

### Controller Network Connection Diagram



# Status LED's

## *Computer/Modem Port*

The computer/modem port has two LEDs to show the flow of data between the IRC-2000 controller and PC or modem. The red RX LED (*LED3*) flashes when the controller receives data. The green TX LED (*LED4*) flashes when the controller transmits data. If the controller is connected directly to the PC, the status LED's flash continuously.

## *Run LED*

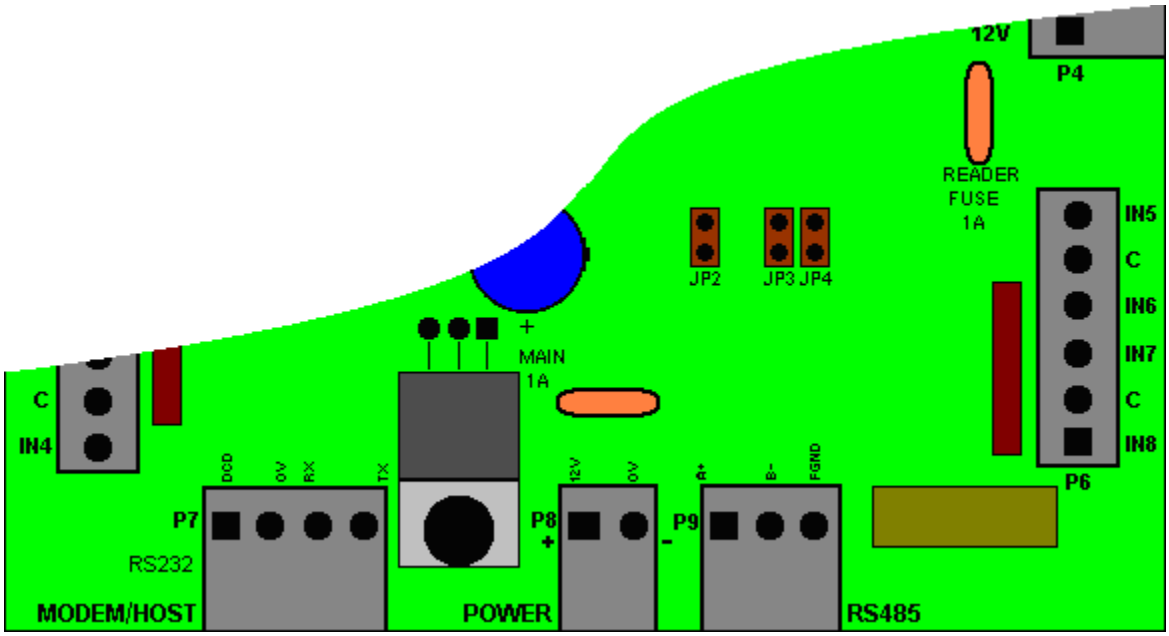
The run LED (*LED2*) flashes to indicate the controller is not communicating, it is on solid when running normally, and off if power is missing.

## *Diagnostic LED*

This LED (*LED1*) will be on if either (*reader A or reader B*) buzzer output is on.

## *Fuses*

There are two 1-amp self-resetting Polyfuses on the IRC-2000 board. F1 is connected to Reader Power and F2 is connected to Main Power.



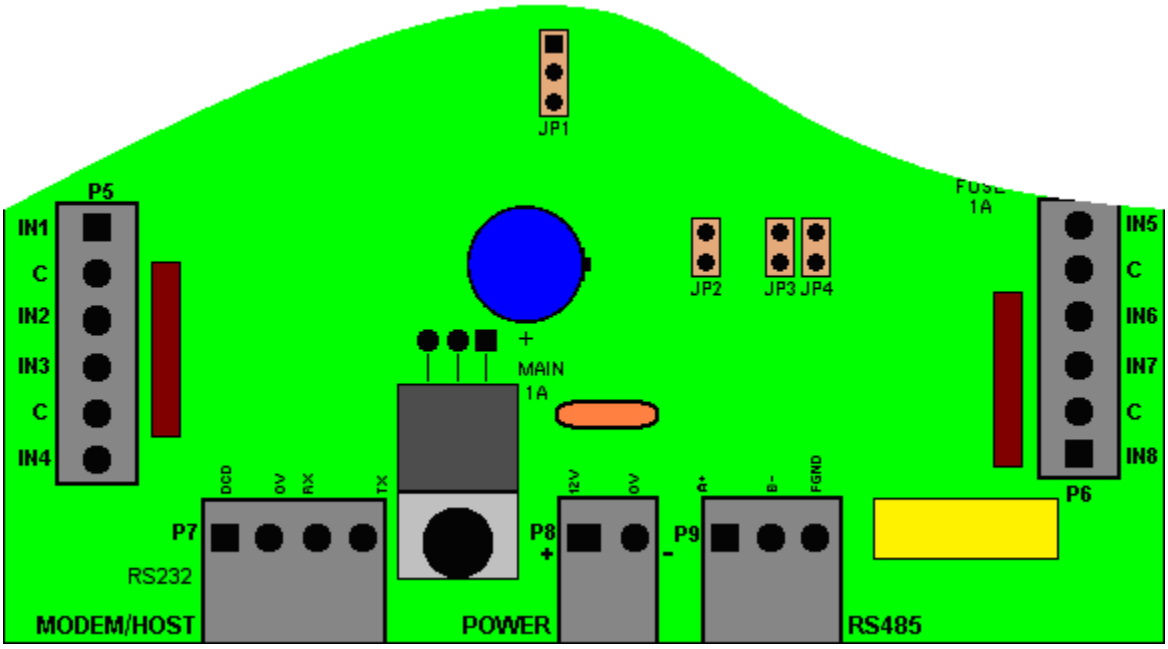
## Jumpers

JP1 The upper position is for RS232, and the lower position is for RS485. (*In a multi-panel network with the first panel connected to the PC via RS-232 and all other panel connected to the first panel via RS-485, set JP1 of panel #1 to RS-232 and all other JP1s to RS-485*)

JP2 Bias Low – RS485 tuning

JP3 Termination – RS485 tuning

JP4 Bias High – RS485 tuning



# URC2000

## Connection Details

### *Power*

The URC-2000 requires 9 to 14 volts DC and draws about 200ma.

### *PC Interface*

The PC interface connects the URC-2000 to a PC through an RS485 (*2-wire*) connection.

### *Inputs*

There are two common terminals for each set of inputs (*one between inputs one and two, another between three and four*). Seven different input types are supported (*including normally open, normally closed, one resistor, and two resistor configurations*).

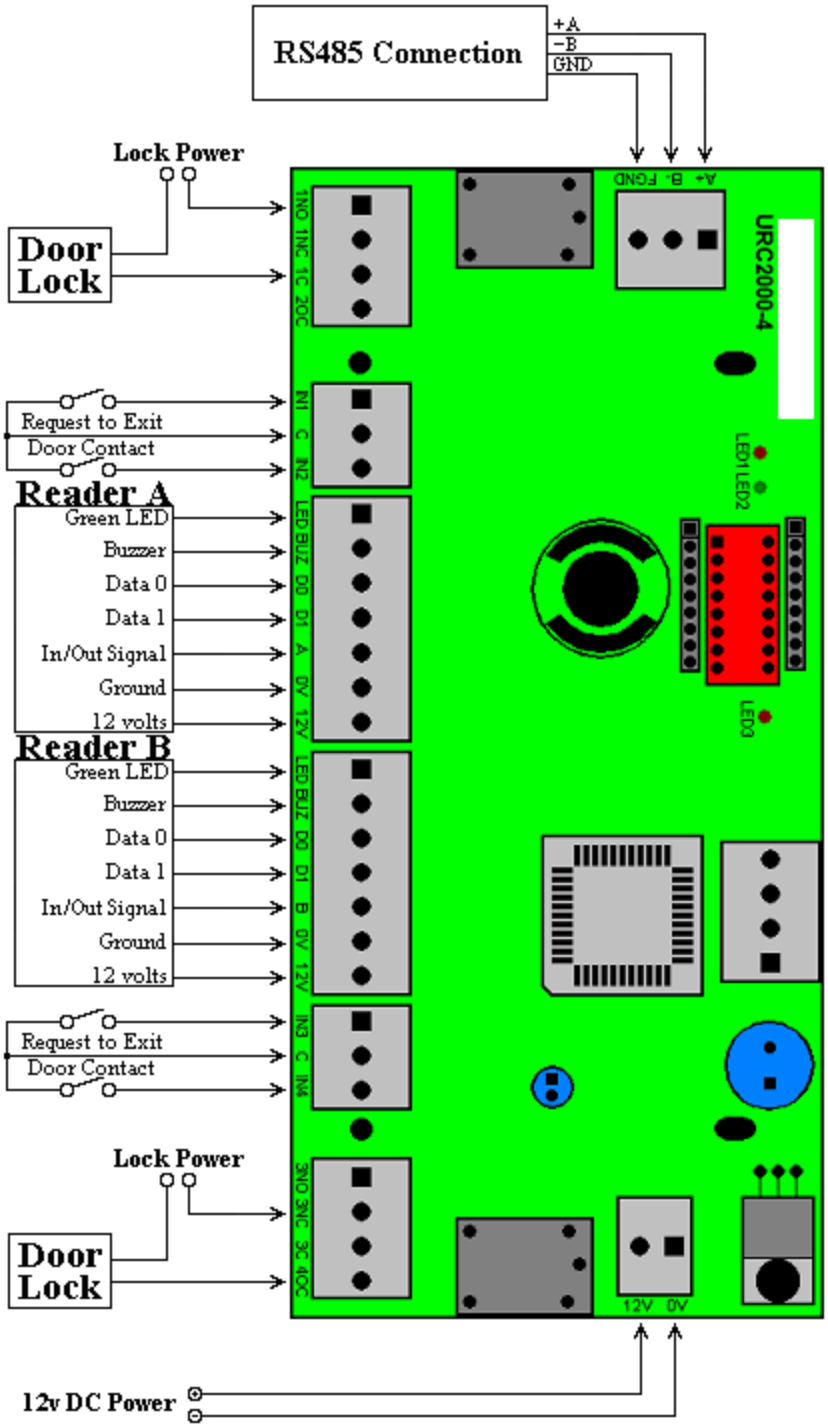
### *Outputs*

Two of the four programmable outputs are dry contact relays (*UL rated 2A @ 30v dc*). These are designated as outputs one, and three. The other two outputs are solid-state switches (*open collector to ground capable of sinking 100ma*).

### *Readers*

Readers are connected to non-programmable outputs BUZ, & LED, as well as data inputs D0 and D1. Both readers have their own connection terminals, reader A is designated as P4 and reader B is designated as P5.

# URC2000 Wiring Diagram



## Earth

The controller contains several layers of protection against induced high voltage transients from static discharge, lightning, and power line spikes. In order for this protection to be fully effective, a good connection to earth ground is essential. Wire this connection to a metal cold water pipe or similar structure. Do not connect directly to the AC earth. Use 16 AWG or heavier cable and keep the length as short as possible (*less than 50 feet [15 meters]*).

For multiple panels always use only a single point ground reference for all panels. Bring the shields of all reader and communication cables back to one location. Do not connect them to the panel or the panel's housing.

## DIP Switch Settings

The URC-2000's DIP switches control a number of operating parameters including the device address and serial port baud rate. The controller must be powered down to accept any changes in the DIP switch settings. Use DIP switches one through five to set the controller address. Switches six and seven set the communication baud rate, and switch eight is used to set the connection type (*modem or direct).*

| DIP Switch | |
|---|---|
| **DIP Switch** | **Function** |
| 1 - 5 | Controller Address |
| 6,7 | Controller Baud Rate |
| 8 | not used |

### *Controller Addressing*

Use DIP switches 1, 2, 3, 4, and 5 to select the controller address. The address is binary coded and the switch settings for all sixteen possible addresses are given below.

| Controller Addressing | | | | | |
|---|---|---|---|---|---|
| **Switch 1** | **Switch 2** | **Switch 3** | **Switch 4** | **Switch 5** | **Address** |
| On | Off | Off | Off | Off | 1 |
| Off | On | Off | Off | Off | 2 |
| On | On | Off | Off | Off | 3 |
| Off | Off | On | Off | Off | 4 |

| | | | | | |
|---|---|---|---|---|---|
| On | Off | On | Off | Off | 5 |
| Off | On | On | Off | Off | 6 |
| On | On | On | Off | Off | 7 |
| Off | Off | Off | On | Off | 8 |
| On | Off | Off | On | Off | 9 |
| Off | On | Off | On | Off | 10 |
| On | On | Off | On | Off | 11 |
| Off | Off | On | On | Off | 12 |
| On | Off | On | On | Off | 13 |
| Off | On | On | On | Off | 14 |
| On | On | On | On | Off | 15 |
| Off | Off | Off | Off | On | 16 |

### *Computer Port Baud Rate Selection*

The controller's RS485 port baud rate is set with DIP switches 6 and 7. This setting determines the speed used to communicate with the PC. All controllers connected to the software through the same port must have the same baud rate. The default PC baud rate is 38,400.

| Controller Baud Rate Selection | | |
|---|---|---|
| **DIP Switch 6** | **DIP Switch 7** | **Baud Rate** |
| OFF | OFF | 9,600 |
| ON | OFF | 28,800 |
| OFF | ON | 38,400 |
| ON | ON | 56,000 |

## PC Connections

### *RS485 Connection*

The URC-2000 controller supports a two-wire RS485 interface. The RS485 interface allows the distance between the controller and the PC to be up to 4000 feet (*1200 meters*). RS485 requires one twisted pair shielded cable.

## Status LED's

### *Communication Port*

The RS485 port has two LEDs to show the flow of data between the URC-2000 controller and PC. The red RX LED (*LED1*) flashes when the controller receives data. The green TX LED (*LED2*) flashes when the controller transmits data. If the controller is connected directly to the PC, the status LED's flash continuously.

### *Run LED*

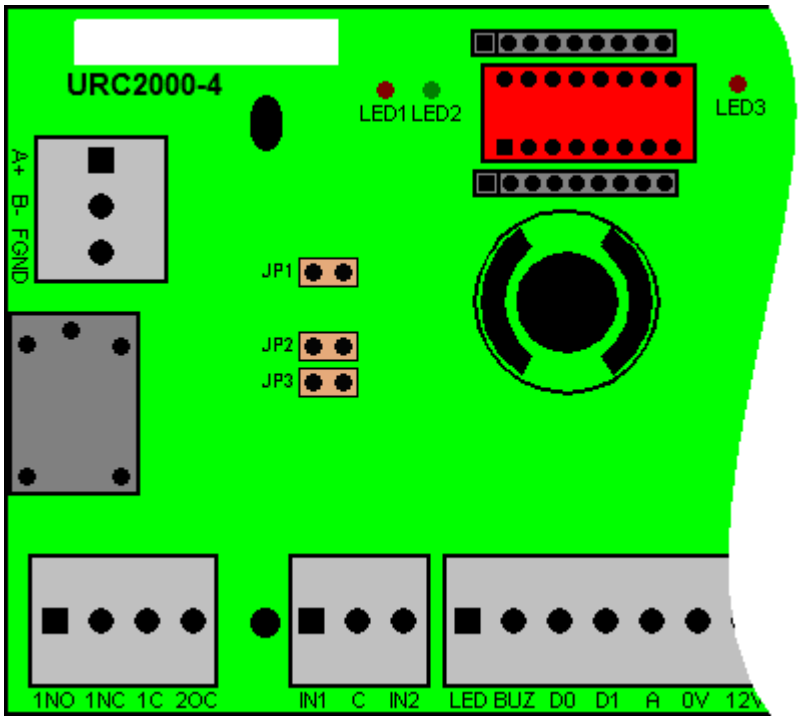
The run LED (*LED3*) flashes to indicate the controller is not communicating, it is on solid when running normally, and off if power is missing.

### *Fuses*

There are two 1-amp self-resetting Polyfuses on the URC-2000 board. F1 is connected to Reader Power and F2 is connected to Main Power.

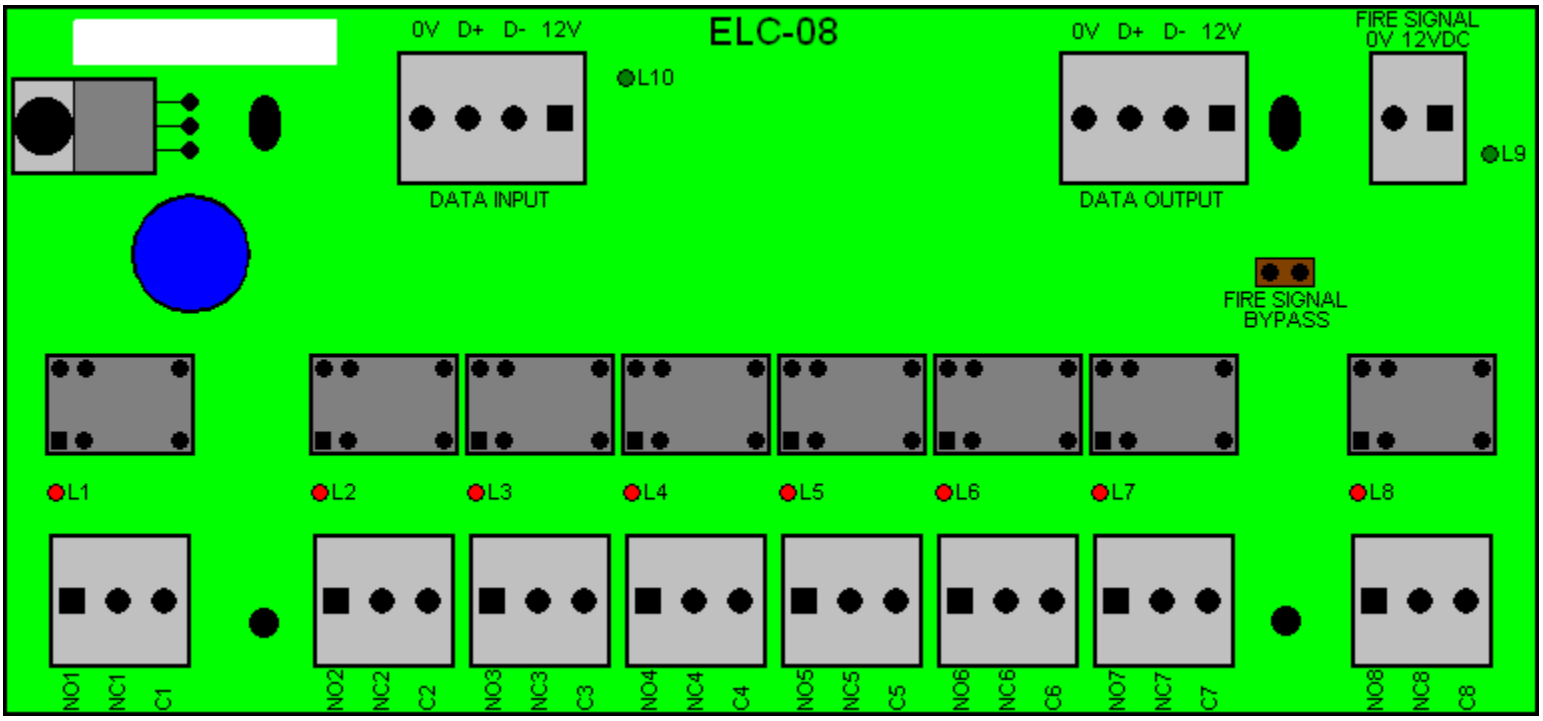
## Jumpers

JP1 Bias Low – RS485 tuning
JP2 Termination – RS485 tuning
JP3 Bias High – RS485 tuning



# Elevator Control

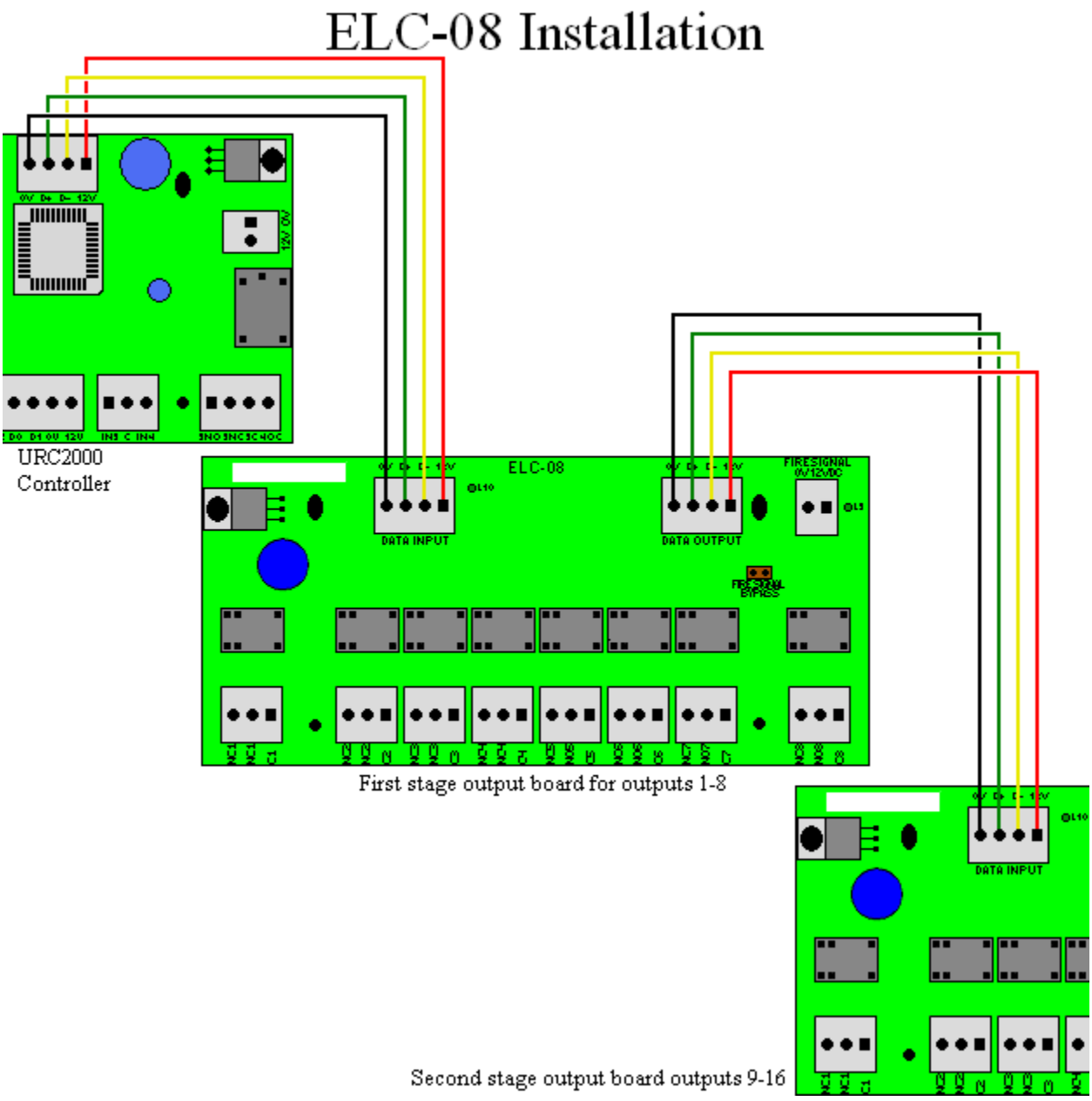
Integra32™ Elevator Control uses a modified URC2000 board with ELC firmware.




Up to four ELC-08 relays boards may be connect (strung) together for a maximum of thirty-two dry contact outputs per Elevator Control panel. These contacts are programmed as "on state de-energized" so that the release of the fire signal or power will place the outputs in the ON state. There are red LEDs (one for each relay) that turn on as each relay is energized therefore indicating an off state.

The green LED next to the data input connector flash when communications is lost. Another green LED next to the Fire Signal connector indicates the presence of a Fire Signal or Fire Signal Bypass.

## Connection Details



## *Power*

The ELC-08 requires 9 to 14 volts DC (connected to the Data Input) and draws a maximum of 325ma.

## *Data Input / Data Output*

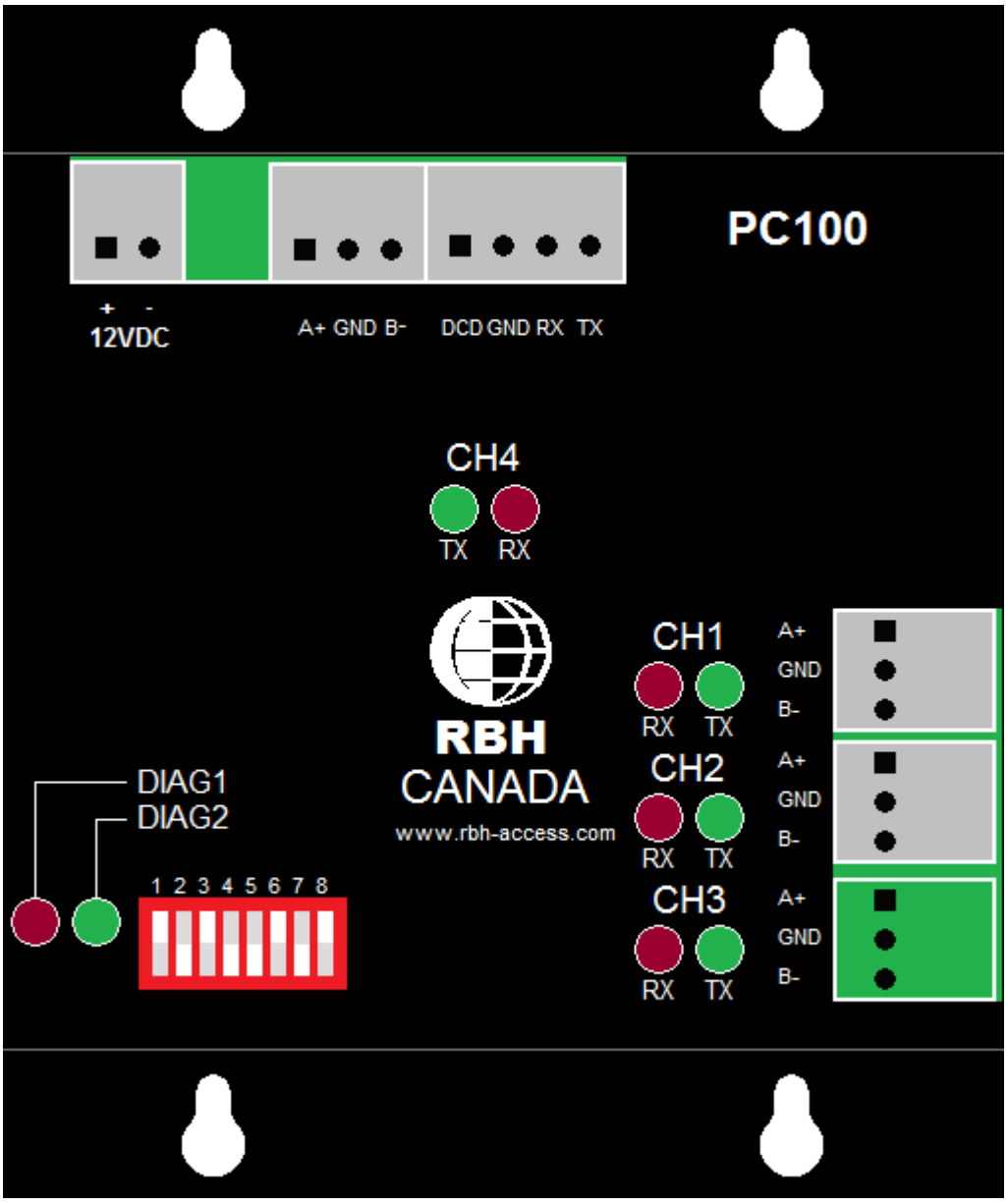
The first ELC-08 is connected to the Elevator URC2000. Four wires are connected as per the diagram above. The second, third, and fourth boards are each connected to the previous board. Board four connected to board three, board three connected to board two, and board two connected to board one. Connect 0v to 0v, D+ to D+, D- to D-, and 12v to 12v.

## *Fire Signal*

Apply 12-24 volts DC to satisfy this input. When this voltage is removed all of the relays on the board will power down (turn ON), making all floors accessible. If the Fire Signal feature is not required install a jumper on the Fire Signal Bypass.

# PC100

## Connection Details




### *Power*

The PC-100 requires 9 to 14 volts DC and draws about 150ma.

### *PC Interface*

The PC interface connects the PC-100 to a PC through an RS232 serial connection at 9600 baud only.

### *RS485 Interfaces*

Connect the PC-100 to IRC-2000 & URC-2000 panels through an RS485 connection, and connect the PC-100 to an Alarm Panel through an RS485 connection.

## Status LED's

### *Health*

The green health LED indicates synchronization with the LSCP bus and the red health LED indicates LSCP problems. For normal operation the green led will be flashing quickly and brightly and the red led will be mostly off.

### *PC Interface*

The PC Interface port has two LEDs to show the flow of data between the PC-100 and the PC. The red RX LED (*LED9*) flashes when the controller receives data. The green TX LED (*LED10*) flashes when the controller transmits data.

### *Access Panel Interface*

The Access Panel Interface is an RS485 port that has two LEDs to show the flow of data between the PC-100 and IRC2000 and/or URC2000 panels. The red RX LED (*LED5*) flashes when the controller receives data. The green TX LED (*LED6*) flashes when the controller transmits data.

### *Alarm Panel Interface*

The Alarm Panel Interface is an RS485 port that has two LEDs to show the flow of data between the PC-100 and a Bosch or a Summit panel. The red RX LED (*LED7*) flashes when the controller receives data. The green TX LED (*LED8*) flashes when the controller transmits data.

## Jumpers

| | |
|---|---|
| JP1 | Do not use (for developmental purposes only). |
| JP2 & JP3 | Both jumpers are left in the upper position for normal operation. This will connect the PC Interface port to the micro controller. Move the jumper to the lower position only if a LAN interface module is attached to the PC100. This will connect the PC Interface port to the LAN interface module for the purpose of programming it. |

# Chapter 3
# Input & Output Connections

## Inputs

The IRC-2000 has eight fully supervised inputs, two sets of four each with two common terminals, and the URC-2000 has four fully supervised inputs, two sets of two each with a common terminal. All inputs are individually programmable from the PC. The panels employ digital filtering to eliminate the effect of interference on the input loops and to verify all loop changes before reporting to the controller.

Each input can report up to four states; Open, Short, Abnormal, and Normal. For example, if the circuit type is programmed as '2 resistor normally closed', 1k represents a normal state and 2k represents an abnormal state. Less than twenty ohms is a short and very high resistance is an open.

### RTE (Request to Exit)

Inputs programmed, as RTE will be connected to push buttons mounted on the door or to motion detectors mounted near the door. Activating the RTE input will cause a grant access to be executed on the appropriate door. The RTE can be disabled by a schedule. Multiple inputs can be programmed as RTEs for the same door.

### DC (Door Contact)

Inputs programmed as door contacts monitor the state of the door. Forced entry, door held open alarm, and door held open warning require monitoring of the door state.

### General Purpose

General Purpose Inputs are inputs that are not tied directly to an access point. The user defines what happens when they change state. They can trigger links, cause alarms, and/or report their change of state.

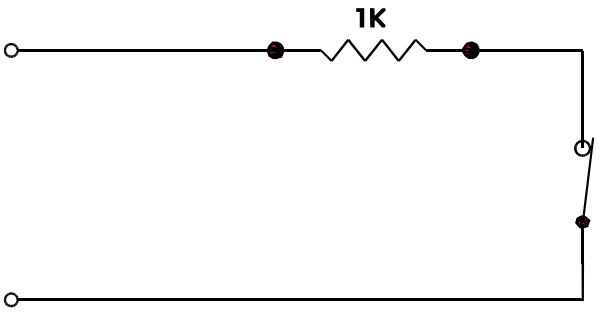
# Input Circuit Types

The IRC-2000 supports seven different input circuit types ranging from no resistor for low security applications to two resistors normally closed circuits where the highest security is required.

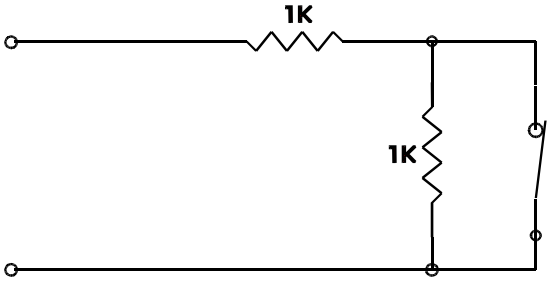
| Normally Closed, No Resistor | |
|---|---|
| **Loop Resistance** | **State** |
| Short | Restore |
| Open Circuit | Alarm |

| Normally Open, No Resistor | |
|---|---|
| **Loop Resistance** | **State** |
| Short | Alarm |
| Open Circuit | Restore |

| Normally Closed, One Resistor | |
|---|---|
| **Loop Resistance** | **State** |
| Short | Trouble |
| 1k | Restore |
| Open Circuit | Alarm |

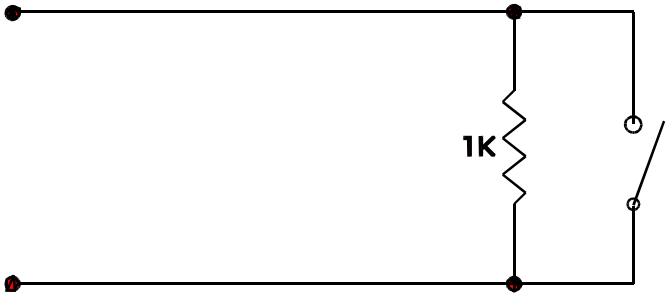



| Normally Closed, Two Resistor | |
|---|---|
| **Loop Resistance** | **State** |
| Short | Trouble |
| 1k | Restore |
| 2k | Alarm |
| Open Circuit | Trouble |

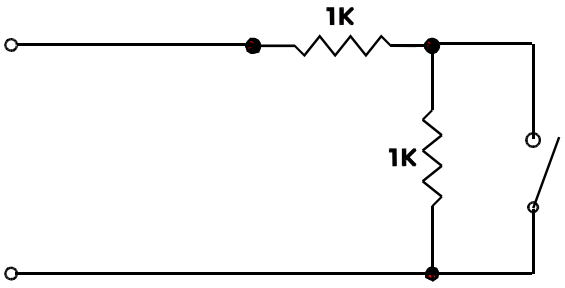



This circuit provides a high degree of supervision and detects both short and open circuit fault conditions. Use this circuit in high security applications.

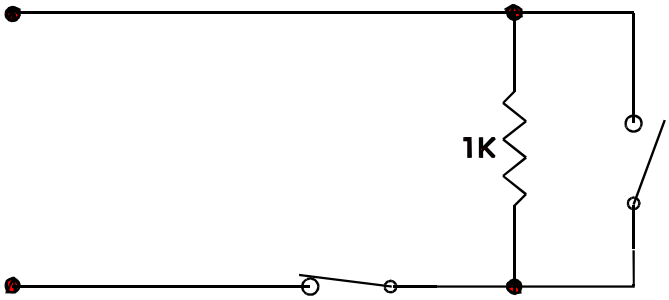
| Normally Open, One Resistor | |
|---|---|
| **Loop Resistance** | **State** |
| Short | Alarm |
| 1k | Restore |
| Open Circuit | Trouble |




| Normally Open, Two Resistor | |
|---|---|
| **Loop Resistance** | **State** |
| Short | Trouble |
| 1k | Alarm |
| 2k | Restore |
| Open Circuit | Trouble |



| Normally Open And Normally Closed, One Resistor | |
|---|---|
| **Loop Resistance** | **State** |
| Short | Alarm |
| 1k | Restore |
| Open Circuit | Alarm |




This circuit type is used where normally open and normally closed contacts are used in the same loop.

# Outputs

The IRC-2000 has eight outputs; four relay outputs and four solid-state outputs. Outputs 1, 2, 5, and 6 are dry contact relays (*UL rated 2A @ 30v dc*). Outputs 3, 4, 7, and 8 use electronic drivers and can switch up to 100ma. The URC-2000 has four outputs, two relay outputs and two solid-state outputs. Outputs 1 and 3 are dry contact relays (*UL rated 2A @ 30v dc*). Outputs 2 and 4 use electronic drivers and can switch up to 100ma.

All outputs are programmable from the PC as 'On State' energized or 'On State' de-energized. 'On State' de-energized outputs are used for fail-safe operation where it is essential that the output return to a safe state when the system fails due to power loss, communications failure, or fire.

Electronic outputs are 'switched negative' which means that they switch the power negative to the terminal. When the output is off, the output terminal is electronically disconnected. Outputs can be programmed for lock or handicap operation (*as described below*), or they can be used as general-purpose outputs.

## Lock Output

The lock output is used to activate or deactivate the locking device on the door. It can apply power to door strikes or remove power from magnetic locks.

## Handicap Output

This output is used to drive door operators. It turns on in less than one second after the Lock Output is turned on, and stays on until the Lock Output is turned off. Only designated cardholders will activate this output.

## Alarm Shunt Output

This output is activated at the same time as the Lock Output and is used to bypass the door contact of a burglar alarm panel. The Alarm Shunt Output will reset with the closure of the access control panel's door contact (*the Alarm Shunt Output will stay activated past the Unlock Time as long as the door is open*). A door with two contacts (*one for the burglar Alarm and one for the access control*) will require an Alarm Shunt Output to prevent the burglar alarm system for going into alarm during a valid entry.

## Modem Power Output

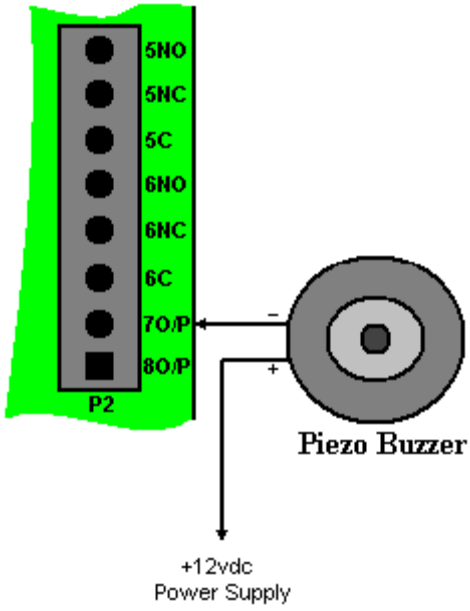
The Modem Power Output is a normally activated output that is used to reset a modem by momentarily removing the power from the modem.

## General Purpose Output

General Purpose Outputs are outputs that are user controlled. They are activated and de-activated by user defined links and schedules.

### Electronic Output Connection Diagram

The electronic outputs are capable of switching up to 100ma to ground.




## Switching Inductive Devices (Locks, Bells)

**Exercise caution when switching an inductive load. Inductive devices include external relay, solenoids, bells, and door locks. All of these devices generate extremely high voltage spikes (*several thousand volts*) when power is applied or removed and possible disruption of the operation could occur if this interference gets on to the electronic circuit board.**

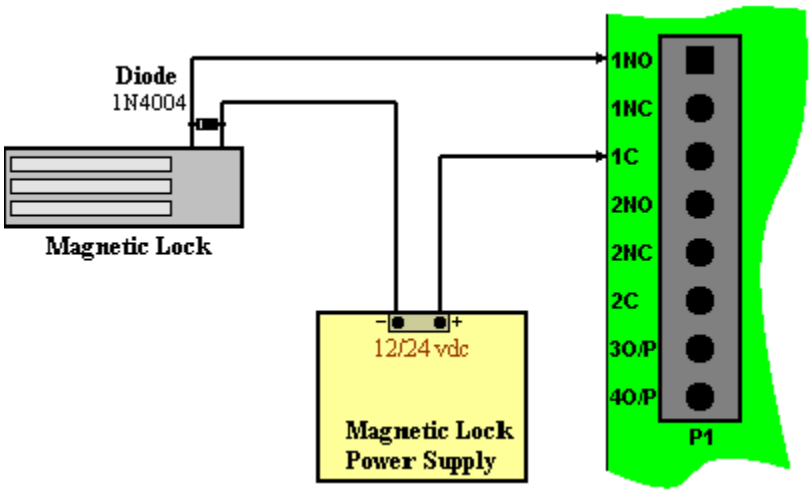
**This interference can be suppressed by placing a diode (*1N4004 or similar*) across the lock or other inductive device being switched. Connect the diode cathode (*end with band*) to the positive terminal and the other end to the negative terminal. The diode must be placed at the device being switched and not at the controller**.

# Relay Output Operation

## Lock Output

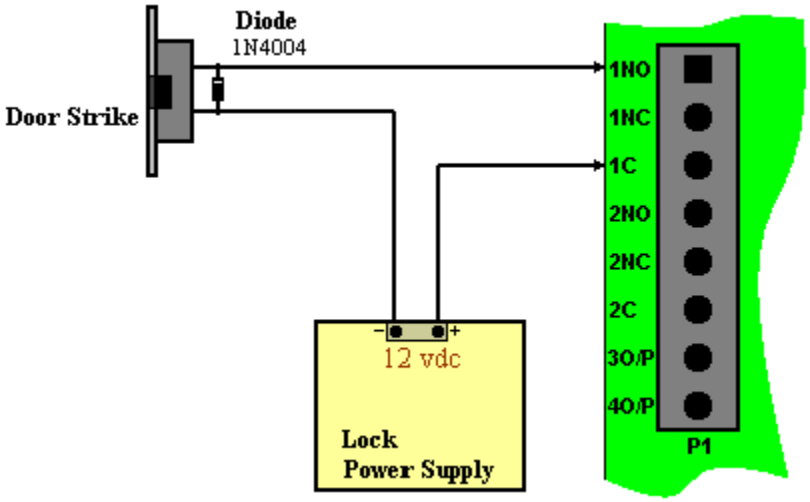
Any output can be used to control a magnetic lock or door strike. Multiple outputs can be set to the same function (*outputs one and two can both be Lock outputs for reader A*).

### Magnetic Lock Connection Diagram

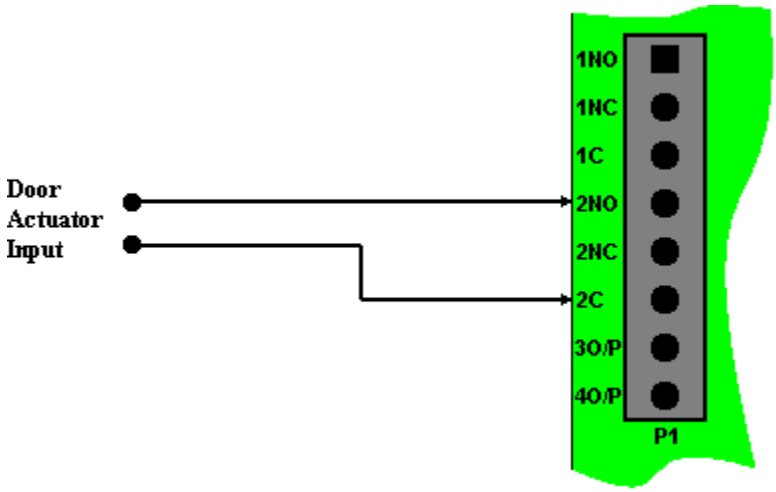



For magnetic locks, the relay should be configured from the PC as 'On State' de-energized for fail-safe operation. If power fails (*AC and battery*), the power to the magnetic lock is removed and the door is opened.

## Door Strike Connection Diagram




## Handicap Output Connection Diagram




**If this output is used with an inductive load, use a back EMF diode (*as described on page 29*) to prevent damage to other equipment.**

# Access Point Operating Modes

## High Security

In high security mode, only cardholders with supervisor privilege are allowed access.

## Unlocked

The green LED turns on to indicate the door is unlocked.

## Door Held Open Warning

The Buzzer beeps slowly.

## Door Held Open Alarm

The Buzzer beeps continuously.

## Keypad / Reader Combination

The Buzzer emits a series of short beeps every second after a card is presented, until a PIN is entered.

## Access Granted

The Buzzer emits one long beep and the green LED turns on for the duration of the unlock time.

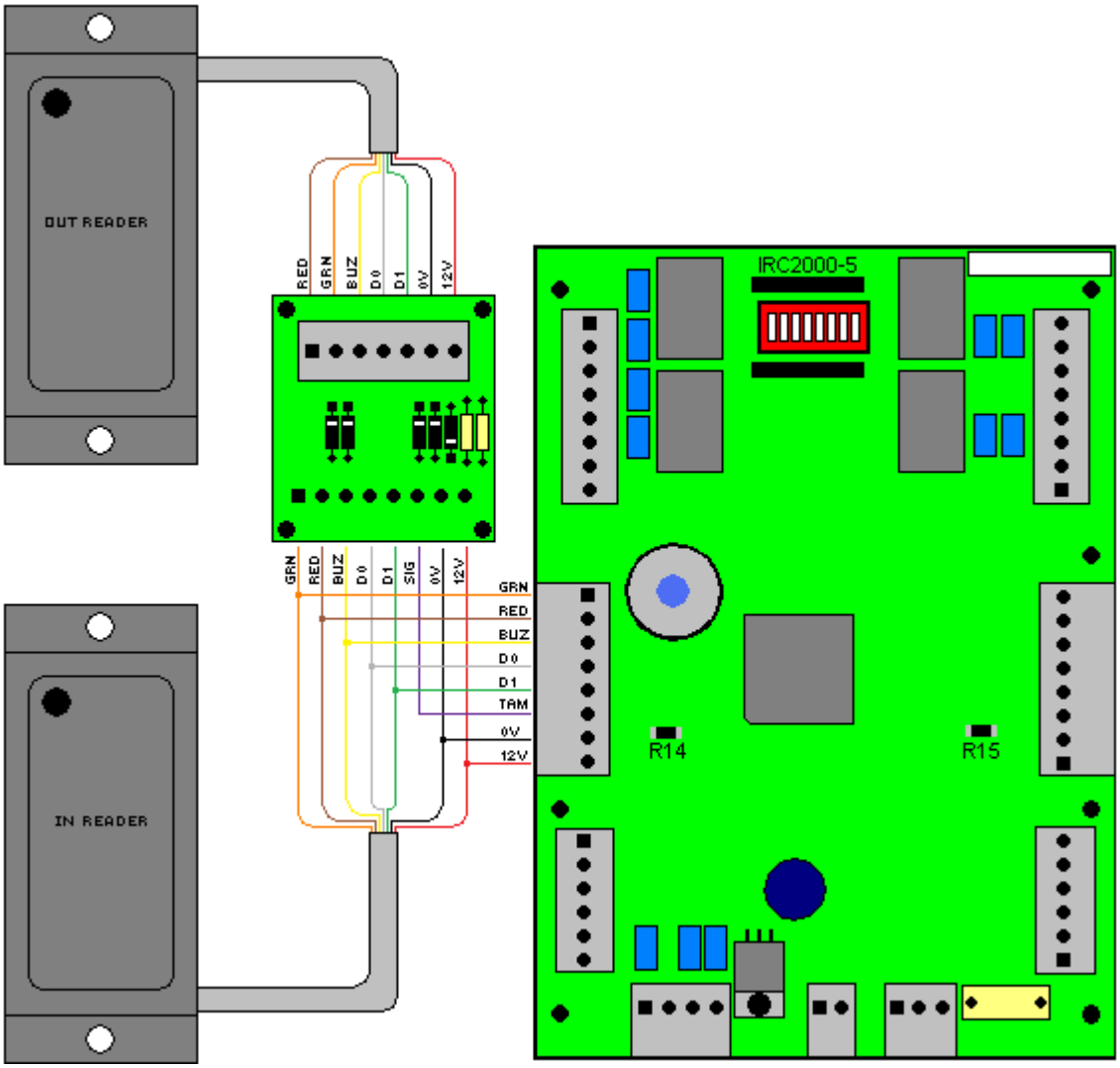
## Access Denied

The Buzzer emits two short beeps and the red led flashes twice.

# Exit Reader Interface Connection Diagrams

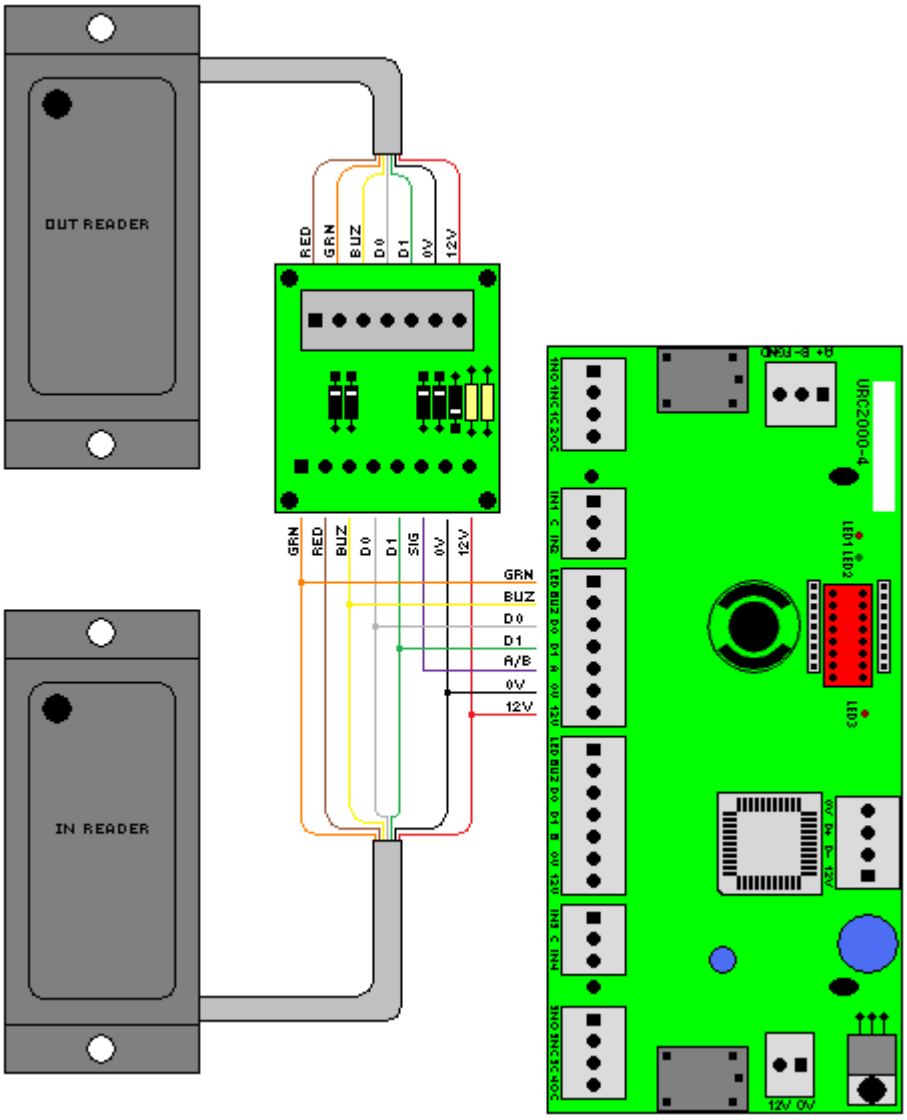
The Exit Reader Interface board enhances the IRC2000 and URC200 panels by allowing the connection of two readers to a single reader port. A single reader port can now have an 'In' and an 'Out' reader.

## IRC-2000 Connection




Connect the 'Out' reader to the seven-pin terminal and the 'In' reader to the eight-pin terminal. Also connect the eight-pin terminal to the panel's reader port. For the IRC2000 connect the SIG terminal of the interface to the TAM terminal on the reader port. If you are connecting to a URC2000 connect the SIG terminal to appropriate A or B terminal as indicated by the diagram below.

# URC-2000 Connection




For more information on the Exit Reader Interface check ‘TB51 Exit Reader Interface.pdf’.

# *Specifications*

# IRC-2000 Specification

| | | |
|---|---|---|
| **Controller Power Requirements**: | 9 – 14V DC | |
| **Current Consumption:** | 250ma | |
| **Flash ROM:** | Download firmware upgrades from the PC to IRC-2000 | |
| **System Capacities:** | IRC-2000's per System | Maximum of 32 |
| | Readers per IRC-2000 | 2 |
| | Cardholder (normal) | Maximum 5,000 |
| | (extended) | Maximum 8,000 |
| | Event Log per IRC-2000 | Maximum 1,400 |
| **Network Connection:** | Type | RS-232 or RS-485 |
| | Serial Port Speed | 9600, 28800, 38400, or 56000 |
| **Real Time Clock:** | Dallas DS1994 with battery back up | |
| **Housing dimensions**: | **H** 12in. x **W** 14in. x **D** 3½in. | |
| **Operating temperature**: | 0 to 70°C (35 - 150°F) | |
| **Operating Humidity**: | 20 to 80% RH (*non-condensing*) | |
| **PC Connection**: | Can be connected via RS232, RS485, or by Modem | |

# URC-2000 Specification

| | | |
|---|---|---|
| **Controller Power Requirements**: | 9 – 14V DC | |
| **Current Consumption:** | 200ma | |
| **Flash ROM:** | Download firmware upgrades from the PC to URC-2000. | |
| **System Capacities:** | URC-2000's per System<br>Readers per URC-2000<br>Cardholder<br>Event Log per URC-2000 | Maximum of 32<br>2<br>Maximum 3,000<br>Maximum 1,400 |
| **Network Connection:** | Type<br>Serial Port Speed | RS-485<br>9600, 28800, 38400, or 56000 |
| **Real Time Clock:** | Dallas DS1994 with battery back up | |
| **Board dimensions**: | **H** 3in. x **W** 6½in. | |
| **Operating temperature**: | 0 to 70°C (35 - 150°F) | |
| **Operating Humidity**: | 20 to 80% RH (*non-condensing*) | |
| **PC Connection**: | Can be connected via RS485. | |

# PC-100 Specification

| | | |
|---|---|---|
| **Controller Power Requirements**: | 9 – 14V DC | |
| **Current Consumption:** | 150ma | |
| **Flash ROM:** | Download firmware upgrades from the PC to PC-100. | |
| **System Capacities:** | PC-100's per System | Maximum of 1 |
| **Network Connection:** | Type<br>Serial Port Speed | RS-232 and RS-485<br>9600, 28800, 38400, or 56000 |
| **Real Time Clock:** | Dallas DS1994 with battery back up | |
| **Board dimensions**: | **H** 4¼in. x **W** 4¾in. | |
| **Operating temperature**: | 0 to 70°C (35 - 150°F) | |
| **Operating Humidity**: | 20 to 80% RH (*non-condensing*) | |
| **PC Connection**: | Can be connected via RS232, RS485, or by Modem | |

# ELC-08 Specification

| | | |
|---|---|---|
| **Controller Power Requirements**: | 9 – 14V DC | |
| **Current Consumption:** | 325ma (max.) | |
| **System Capacities:** | ELC-08's per URC2000 | Maximum of 4 |
| **Network Connection:** | Type | RS-485 |
| **Relay Outputs:** | 1A @ 30vdc | |
| **Board dimensions**: | **H** 3in. x **W** 6½in. | |
| **Operating temperature**: | 0 to 70°C (35 - 150°F) | |
| **Operating Humidity**: | 20 to 80% RH (*non-condensing*) | |

# Cable Specification

**PC to Controller**

**RS232:** 3 or 4-conductor shielded, 18 to 22 AWG
**Maximum Cable Length**

| | |
|---|---|
| 9600 baud | 150 feet (50 meters) |
| 56000 baud | 50 feet (15 meters) |

**2 Wire RS485:** Single twisted pair, shielded 18 to 22 AWG
**Maximum Cable Length**
4000 feet (1200 meters)

**IRC-2000/URC-2000 to Reader:**

20 to 22 AWG, 6 or 8 conductor, stranded, shielded (*not twisted*)
**Maximum Cable Length**

| | |
|---|---|
| 22 AWG Cable | 250 feet (75 meters) |
| 20 AWG Cable | 500 feet (150 meters) |

**PC-100**

**RS232 to PC:** 3 or 4-conductor shielded, 18 to 22 AWG
**Maximum Cable Length**

| | |
|---|---|
| 9600 baud | 150 feet (50 meters) |
| 56000 baud | 50 feet (15 meters) |

**2 Wire RS485 to panels:** Single twisted pair, shielded 18 to 22 AWG
**Maximum Cable Length**
4000 feet (1200 meters)

**Input / Output Port Circuit Loop:**

2-conductor, 20 to 22 AWG
**Maximum Cable Length**
1000 feet (300 meters)

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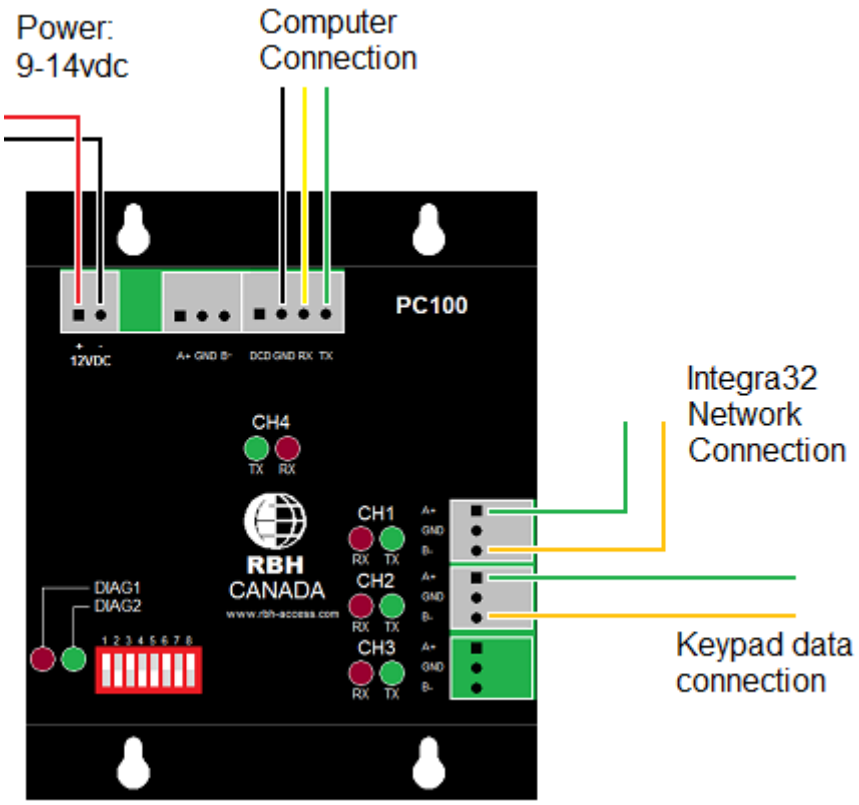
# Appendix A: PC-100 Interface Applications

The PC-100 communications interface can be used for a number of different applications.

PC-100s can be used to interface alarm panels with the Integra™ system. Some DSC, Bosch, Summit, Gardtec, Rokonet, and Paradox alarm panels can be interfaced this way.

## Wiring




The PC-100 connects to the IRC-2000 through the RS-485.

### *Power*

9-14vdc @ 150ma

### *LEDs*

DIAG1 – Interface status
DIAG2 – Integra status:

Communication Channel LEDs – Each communication channel has a green transmit LED and a red receive LED.

Normally flashing at a rate of once a second, DIAG2 will flash twice as fast if the unit is offline with the Integra network.

# DSC Alarm Panel Interface

It is recommended that the user be familiar with the DSC alarm panel and has the ability to program PIN codes and parameters into the panel.
The PC100 interface has been designed to connect the Integra network to the DSC alarm panel through the keypad bus. It will emulate a keypad when a link has been provided and report status to the Integra network when included in the list of keypads.

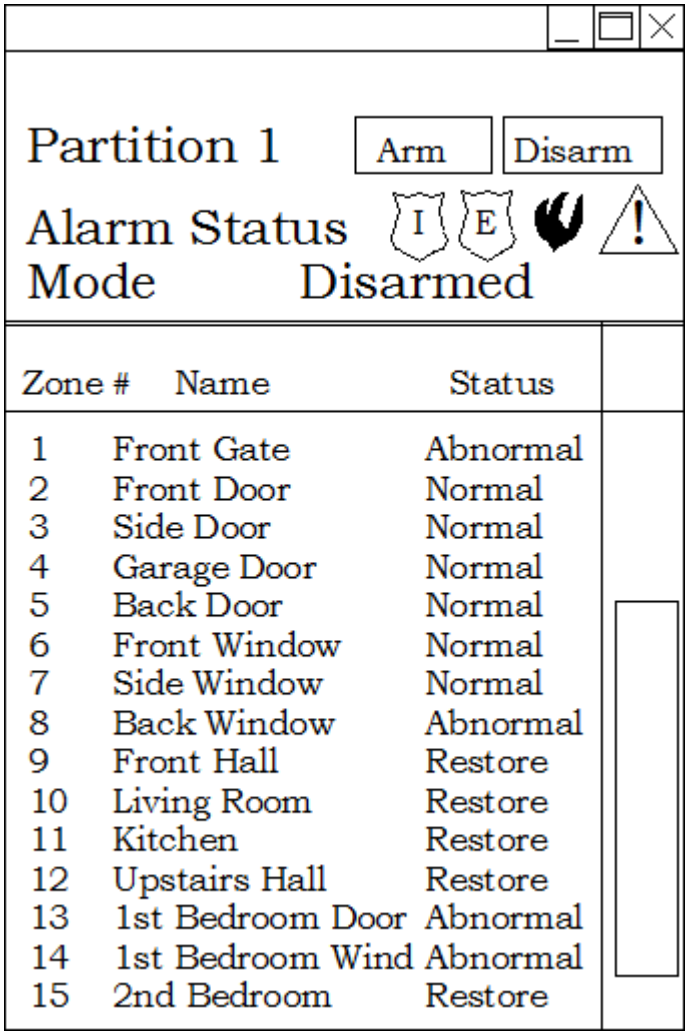
## *Keypad States*

The emulated keypads in this case are representations of partition states. A partition can be armed, disarmed or in alarm. Panic, Emergency, and Fire alarms initiated by the alarm panel will be reflected on the first keypad.

## *Input States*

In addition to the keypads the PC100 will also emulate 256 inputs. Each input address will be mapped directly from the DSC alarm panel interface. When an input changes state on the alarm panel the PC100 will report the change of state as if it happened on its own panel.

## *Status Display*



Some inputs such as smoke detectors are always armed so they will only be able to display Restore or Alarm. Inputs such as Entry types are delayed so that at first they will display the disarmed states Normal and Abnormal followed by Alarm if the timed entry fails.
In order to display a partition's status a database has to be created to store the zone names and its partition reference.

# Bosch Alarm Panel Interface

It is recommended that the user be familiar with the DS7400Xi panel and has the ability to program PIN codes and parameters into the panel.

The PC100 interface has been designed to connect the Integra network to the DS7400Xi alarm panel through the option or keypad bus. It will emulate a keypad when a link has been provided and report status to the Integra network when included in the list of keypads. If you observe the red and green led associated with the keypad network you should notice the red LED flashing as it receives data and the green LED flashing as it responds to polls. The response to polls will only occur under the following conditions:

1) The keypad address is included in the list of keypads programmed in the Integra network

2) The keypad emulation box has been checked.

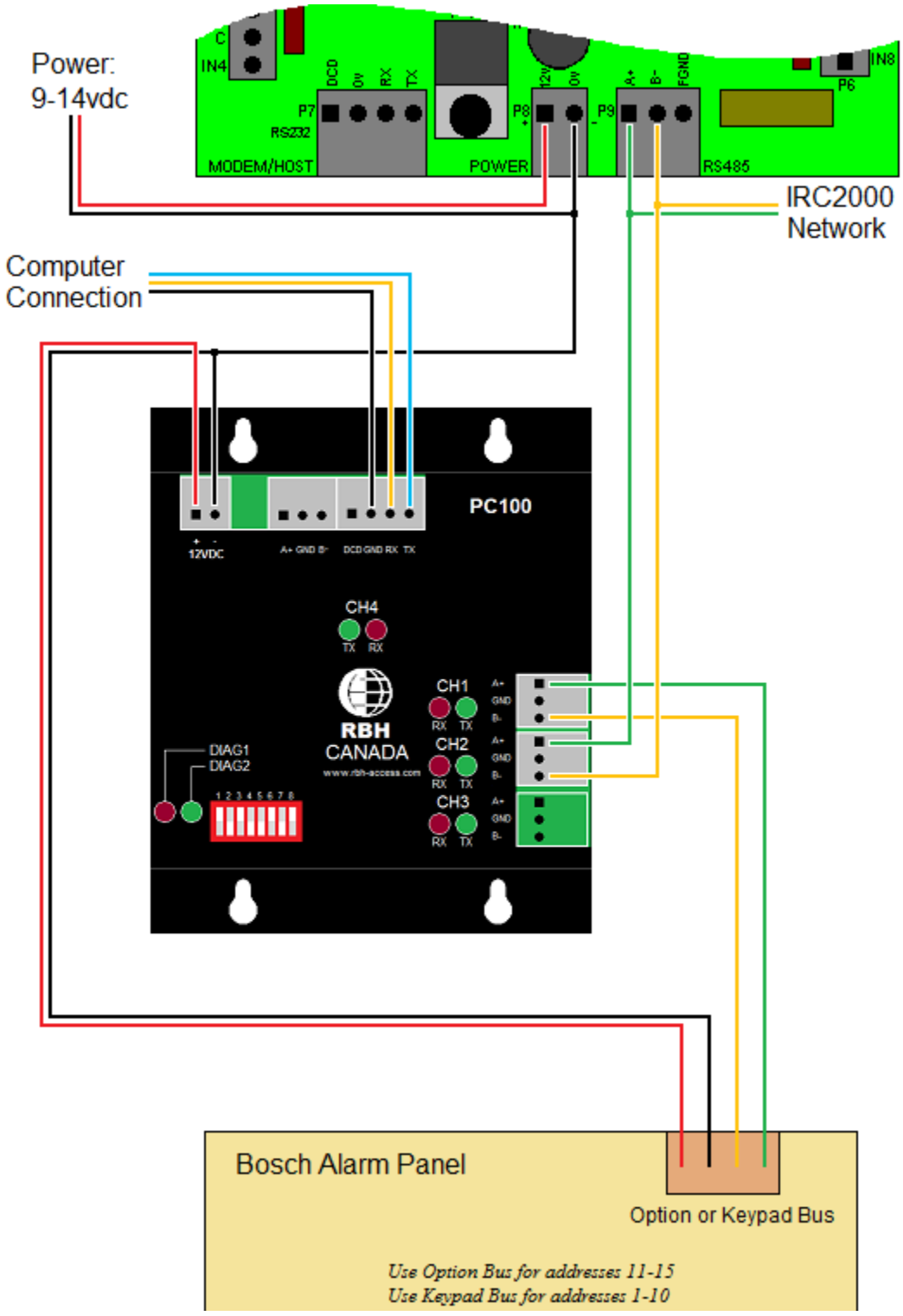
3) The keypad address has been programmed into the alarm panel.

In order for the alarm panel to poll the emulated keypad the keypad assignment for the alarm panel should be programmed. Keypad addresses 1-10 connect to the keypad bus and addresses 11-15 is connected to the option bus.

The PC100 can monitor all keypads on the bus that are listed under panel properties "Keypads".

A Link to an Event will use an emulated keypad to enter a password followed by a command. If the password is not programmed into the alarm panel no operation will take place. Whenever a command is executed the green "DIAG2" LED will turn on. The green "DIAG2" LED will turn off when the alarm panel finishes its poll to the keypad.

Do not overload the power supply by connecting the IRC2000's along with their weigand readers to the Bosch +12v supply.


Power:
9-14vdc
C
IN4
DCD
0v
RX
TX
P7
RS232
MODEM/HOST
P8
12v
0v
POWER
P9
A+
B-
FGND
RS485
P6
IN8
IRC2000
Network
Computer
Connection
PC100
12VDC
A+ GND B-
DCD GND RX TX
CH4
TX RX
RBH
CANADA
www.rbh-access.com
CH1
RX TX
CH2
RX TX
CH3
RX TX
A+
GND
B-
DIAG1
DIAG2
1 2 3 4 5 6 7 8
Bosch Alarm Panel
Option or Keypad Bus
Use Option Bus for addresses 11-15
Use Keypad Bus for addresses 1-10

# Summit Alarm Panel Interface

## *General description*

The PC100 when made for the Summit application will interface the Electronics Line Summit alarm panel to the IRC2000 access control system.

1) (RS232, RS485, TCP/IP) Host – for communication with the PC software running Integra32™.

2) (RS485) Panel – for connection to the LSCP bus on the Summit alarm panel.

3) (RS485) IRC – for connection to the Access control system.

All channels are programmed for a baud rate of 9600 8-bits no parity and all Integra32™ panels need to be programmed for 9600 baud.

All activity is synchronized to the Summit LSCP bus. If the bus is disconnected all activity on the PC100 will halt. The PC100 acts like a zone expander to the Summit panel allowing up to 32 zones. Each zone is mapped to an element in the IRC network. The state of each element in the IRC network will cause a zone to appear open or closed.

The PC100 acts like an IRC panel at address 32 to the host. The host can poll the PC100 to see if it is online, request status, write to memory, and update flash memory.

***IRC2000 panels connected along with the PC100 must be running firmware version 76 or higher for the PC100 and the IRC2000 panels to function together correctly.***

## *Programming an Arm/Disarm key-switch*

When an Access Granted message is used as a source for an input, the status of the alarm panel is checked before execution is allowed. If the function is to disarm the panel and the panel is already disarmed no action will take place. Conversely if the function is to arm the panel and the panel is already armed the command will be ignored.

The key-switch functionality works on the basis of a momentary contact. Whenever the button is pushed the alarm panel will change states if possible when the switch returns to its closed position. It is not allowed to arm if an exterior zone is open for example.

Each zone can be programmed manually through the keyboard interface.

There are two types of arming allowed - STAY and AWAY.

## *Sharing a door contact*

It is possible to use the door contact of the access control system to be mapped to the door contact of the alarm panel as long as the reporting for the door contact is enabled by software.

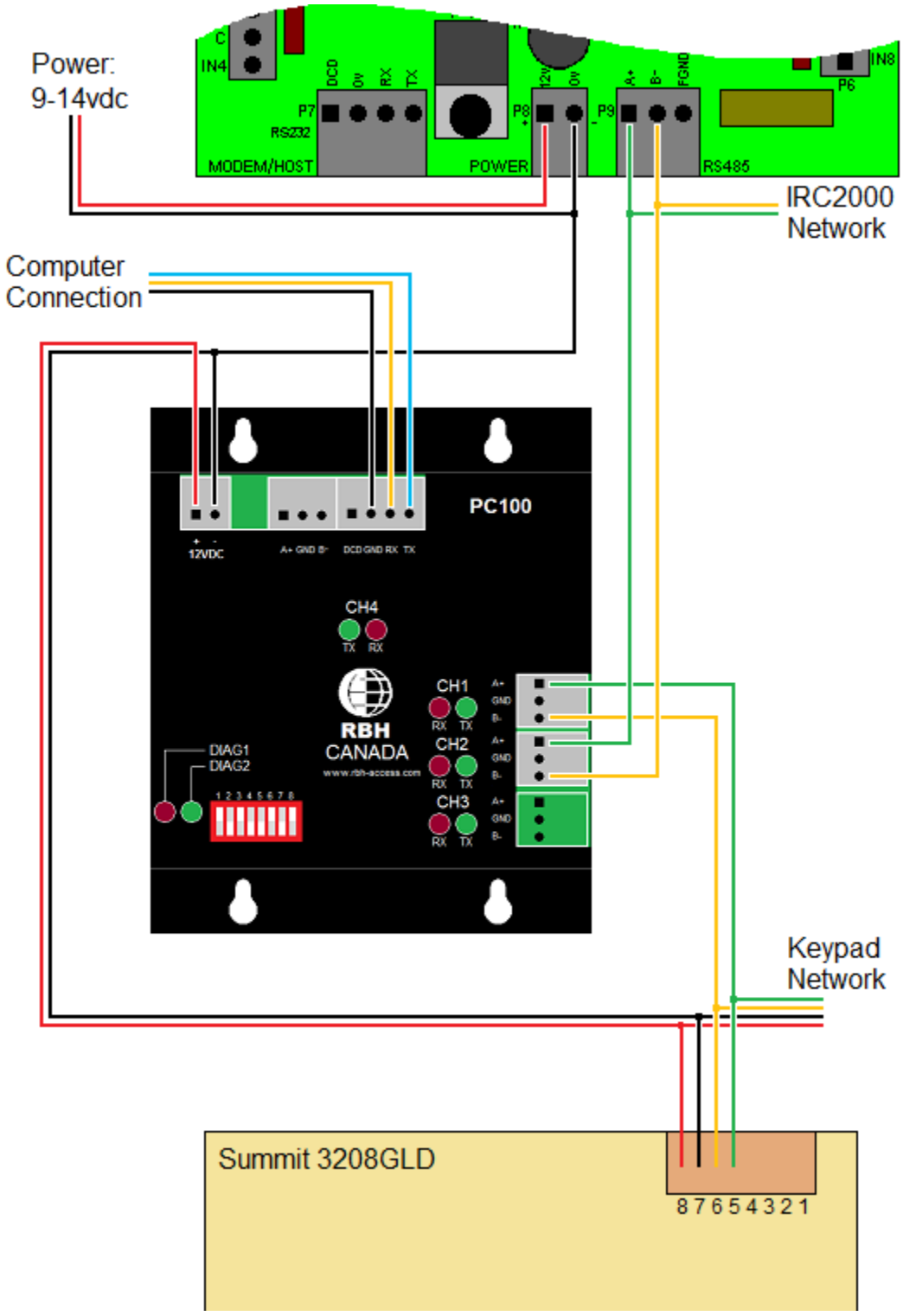
## *Using Alarms*

Three types of alarms with A or B readers are allowed.

| |
|---|
| DHO alarm reader “A” |
| DHO alarm reader “B” |
| Forced entry reader “A” |
| Forced entry reader “B” |
| Reader Tamper “A” |
| Reader tamper “B” |

## *Multiple Combinations*

For multiple combinations of inputs/outputs and events a spare output on an IRC panel can be assigned this functionality, through the use of links. The output can be assigned to a Summit input and instructed to follow.


Power:
9-14vdc
C
IN4
DCD
0v
RX
TX
P7
RS232
MODEM/HOST
P8
12v
0v
POWER
P9
A+
B-
FGND
RS485
P6
IN8
IRC2000
Network
Computer
Connection
PC100
12VDC
A+ GND B-
DCD GND RX TX
CH4
TX RX
RBH
CANADA
www.rbh-access.com
CH1
CH2
CH3
RX TX
A+
GND
B-
DIAG1
DIAG2
1 2 3 4 5 6 7 8
Keypad
Network
Summit 3208GLD
8 7 6 5 4 3 2 1

# Appendix B: Dialup Modem Configuration

Setting up a dialup network requires two (2) modems – one connected to a serial port on the Server and one connected to the first IRC2000 board at the remote site.

## Remote Site Modem:

1. Set DIP Switches 1 through 5 to define the IRC2000's address.
2. RBH recommends a U.S.Robotics® external Sportster modems and a baud rate of 9600.
3. Make any DIPswitch settings on your modem as per your modem manual and the Integra32™ hardware manual.

| Parameter | Setting |
|---|---|
| Auto Answer (AA) | ON |
| Data Terminal Ready (DTR) or (TR) | ON (Override) |
| Verbal Result Codes | ON |
| Suppress Result Codes | OFF |
| Echo Commands | OFF |
| Carrier Detect (CD) | OFF (Normal) |

*These settings on the recommended modem would mean that all modem DIPswitches (1, 3, 4, 7, and 8) were down, except switches 2, 5, & 6, which will be up.*

Note: PC side modem will not work with above DIP switches settings. PC side modem has to be set to default settings (3, 5, 8)

4. Check the telephone line for dial tone and connect the phone cord to the modem.
5. Power up the modem and check the front panel lights to verify that the AA, TR, and CD settings are correct as per the above table.
6. Plug in the IRC2000 to Modem cable (*See the Hardware Manual for pin outs*)
7. Power up the IRC2000. The IRC2000 will automatically reset the modem and download the initialization string required to receive a call from the Server modem.

# Server (Host) Site Modem:

## *Install modem in Windows*

1. Use the modem setup (*TAPI*) screen in Windows Control Panel to install a modem for any available COM port on the Server.

2. From the Modem Properties window you can add a modem, remove a modem, or edit modem properties (You can access modem properties from Control Panel). Click the Add button.

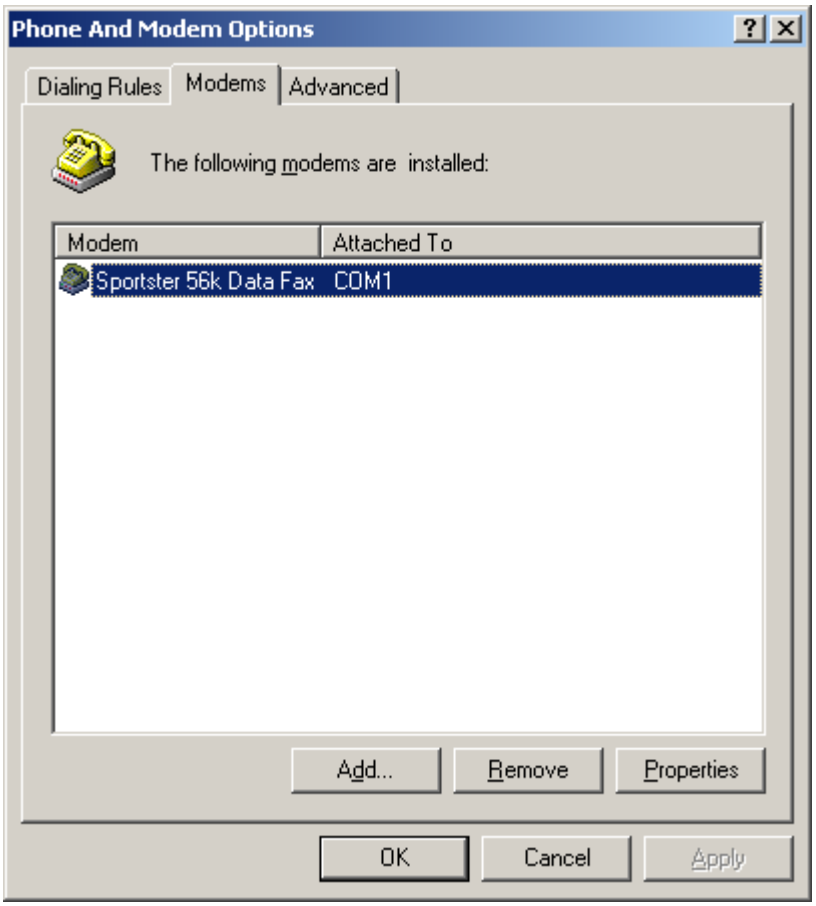



Figure1: Phone and modem Options window.

3. You may choose to let the Install New Modem wizard auto detect your modem or select it yourself. You will have to specify the COM port that you will use for that modem.

4. Once the modem has been installed, you may edit the settings to correspond with the remote site(*s*) settings.

5. In Figure 2, right click on modem and select properties to open modem properties window.

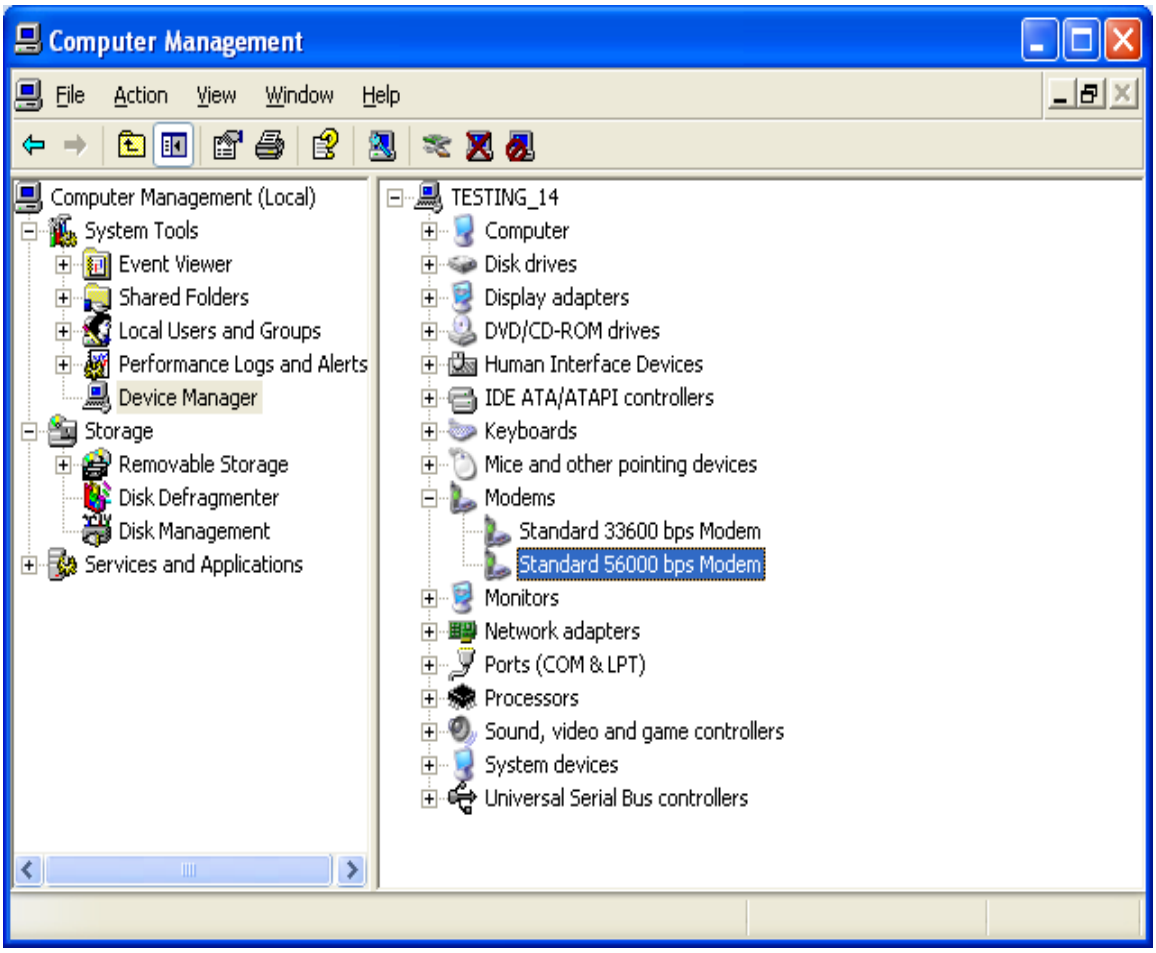



Figure 2: Opening modem properties from device Manager.

6. Use the Properties button to set the desired modem parameters e.g. Max. Speed of 9600 for a 56.6k modem. Use parameters appropriate for the remote site that you are connecting to.

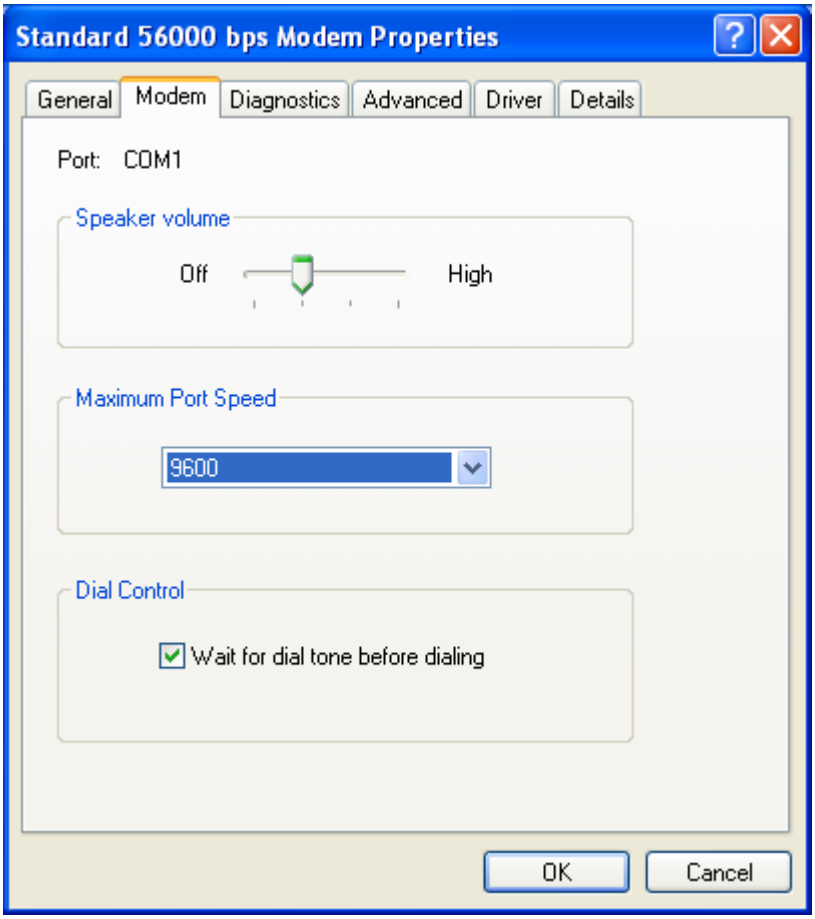



Figure 3: Modem properties

6. Set Advanced Connection Settings as follows.

   Include ‘Extra Initialization Commands’ of &N6 to further force a baud rate of 9600.

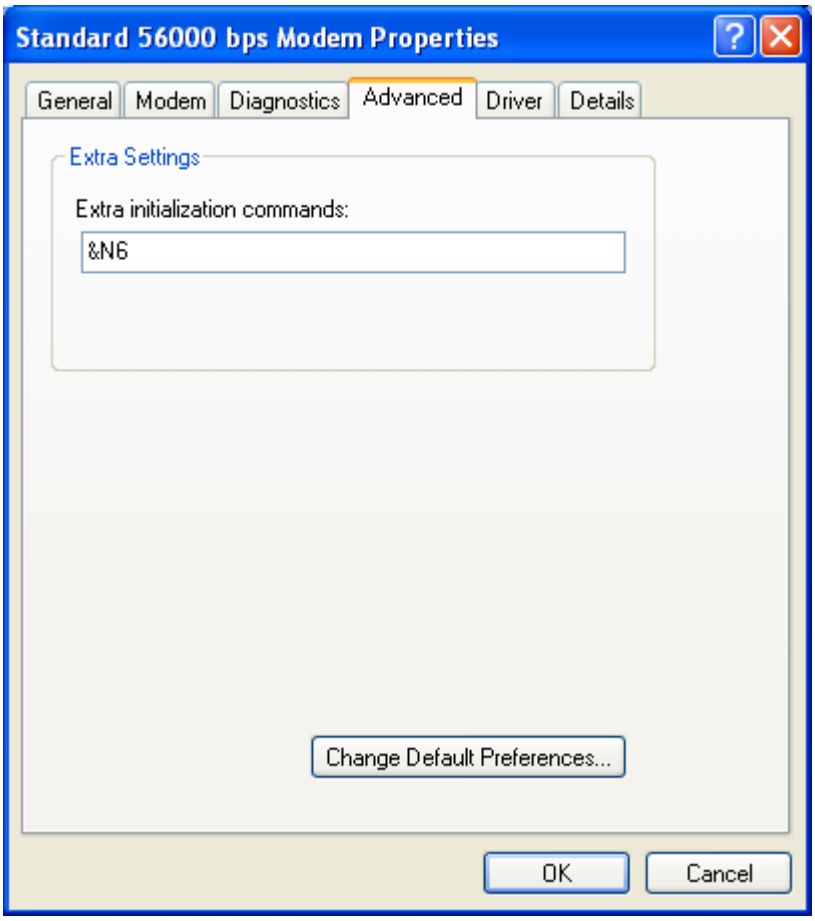



Figure 4: Modem Properties

Click on Query Modem button (Figure 5), and you will see 'success' message (Figure 6). Otherwise, you will see 'communication fails' message (Figure 7).

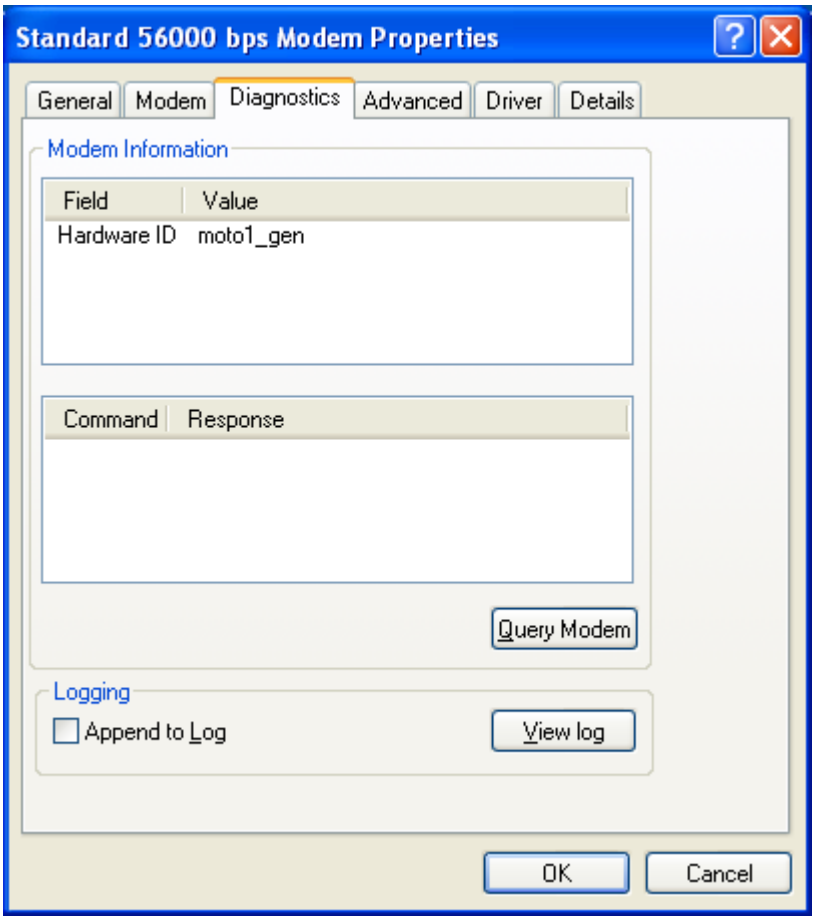



Figure 5: Modem Diagnostics properties

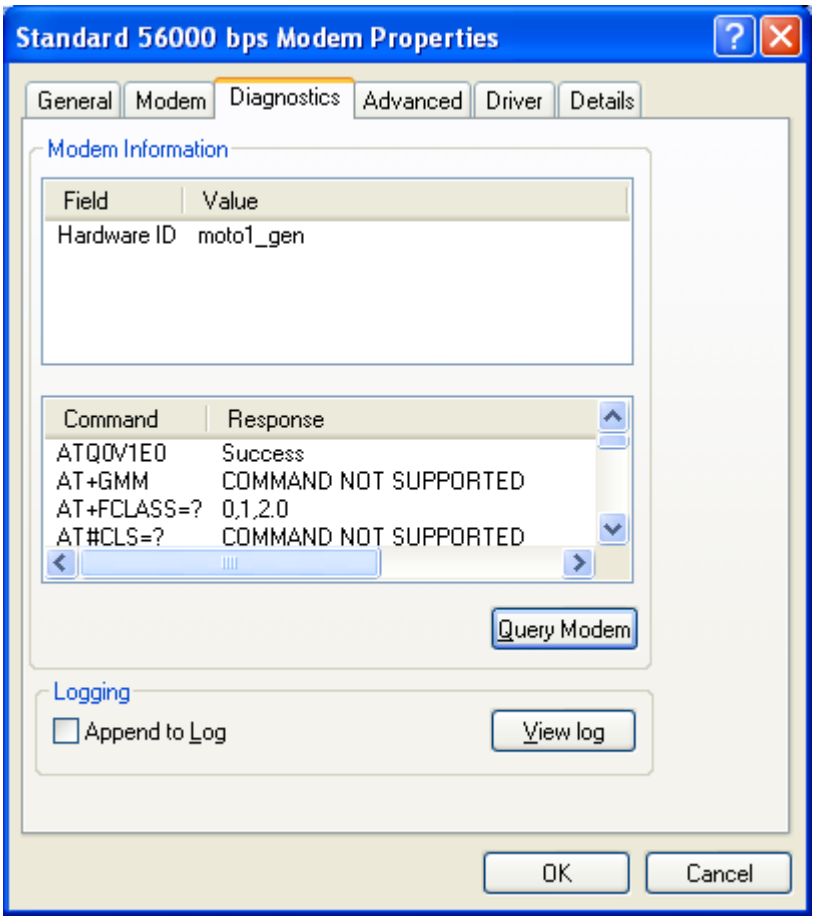



Figure 6: modem Query results

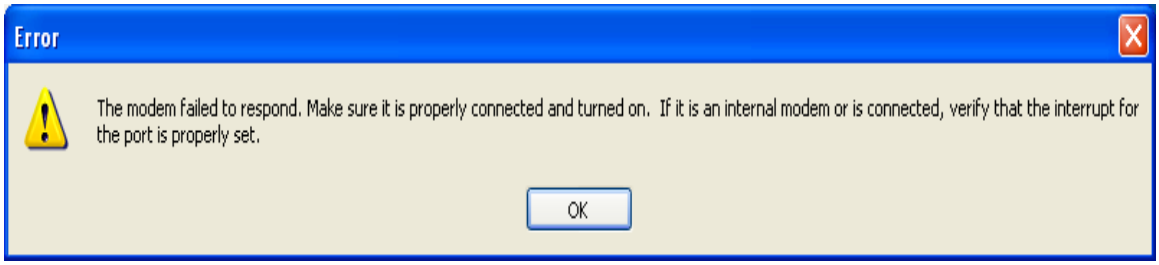

Error
The modem failed to respond. Make sure it is properly connected and turned on. If it is an internal modem or is connected, verify that the interrupt for the port is properly set.
OK

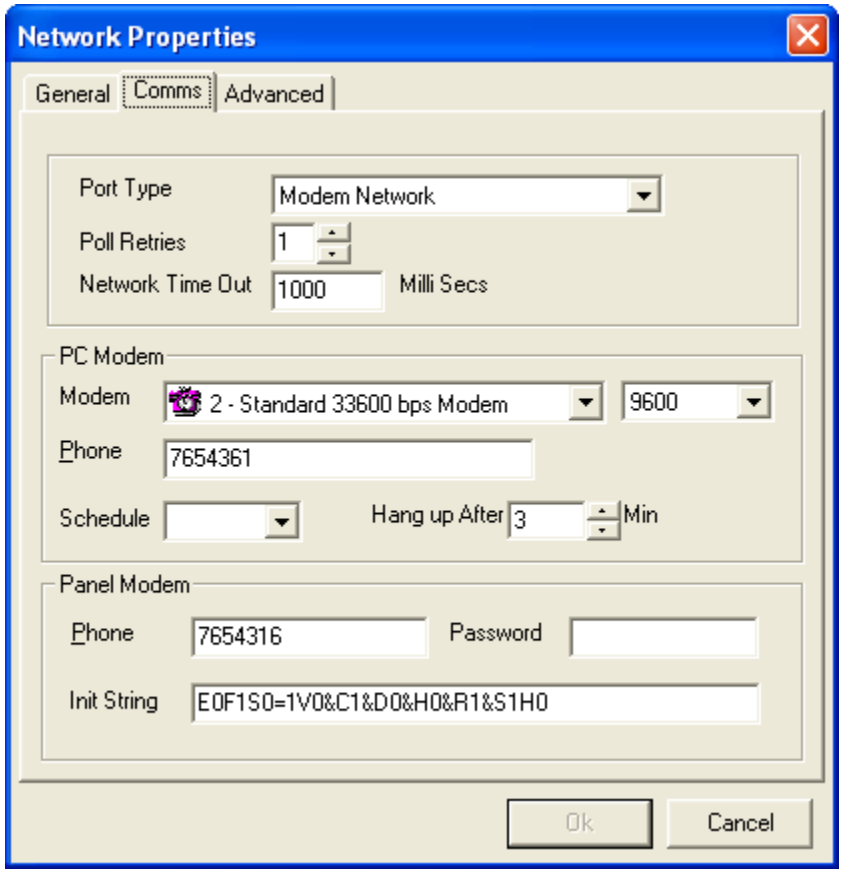
Figure 7: Modem Query error message.

## *Cautions/Procedure for Modems connection*

1. Dipswitch 8 of all IRC-2000s should be set to OFF before making the modem connection.
2. After establishing the modem connection, download to all IRC-2000s and not just the IRC-2000 to which modem is connected *(so that the password is downloaded to all the panels)*.
3. Change all Dipswitch 8s to ON.
4. Re-power the IRC-2000s.

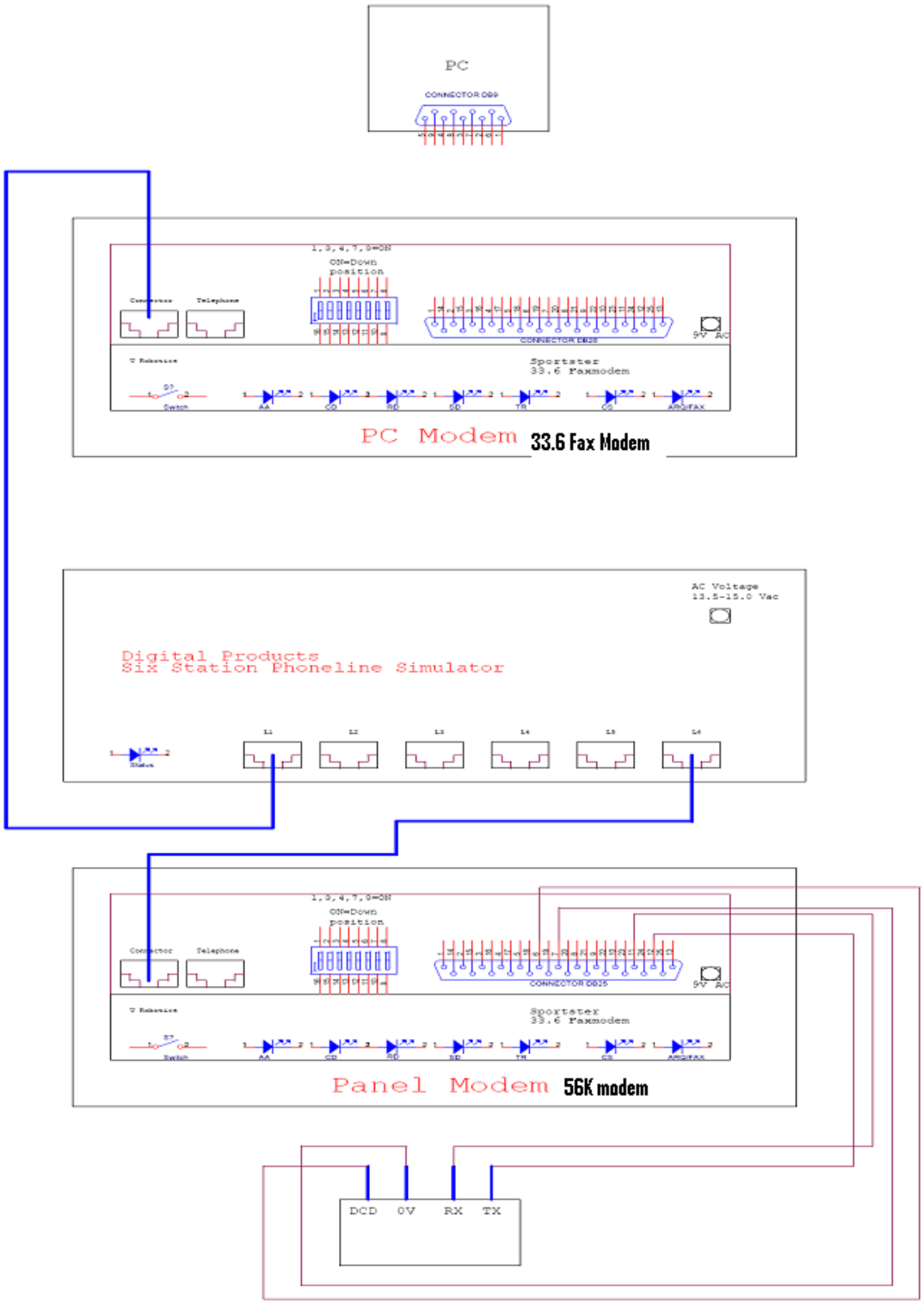
## *Configure Modem COM Port on the Integra32™ Server*

1. Open the Network Properties window in the Integra32™ Database Manager.




2. Click on Port Type and select Modem Network.
3. Use the Modem combo box down arrow and select the modem from those already setup under Windows.
4. Set the baud rate 9600 and Phone number (for the software to call the remote site).
5. Enter a password. (Connect the first time with Dip switch 8 off.)
6. Click OK to complete the configuration.

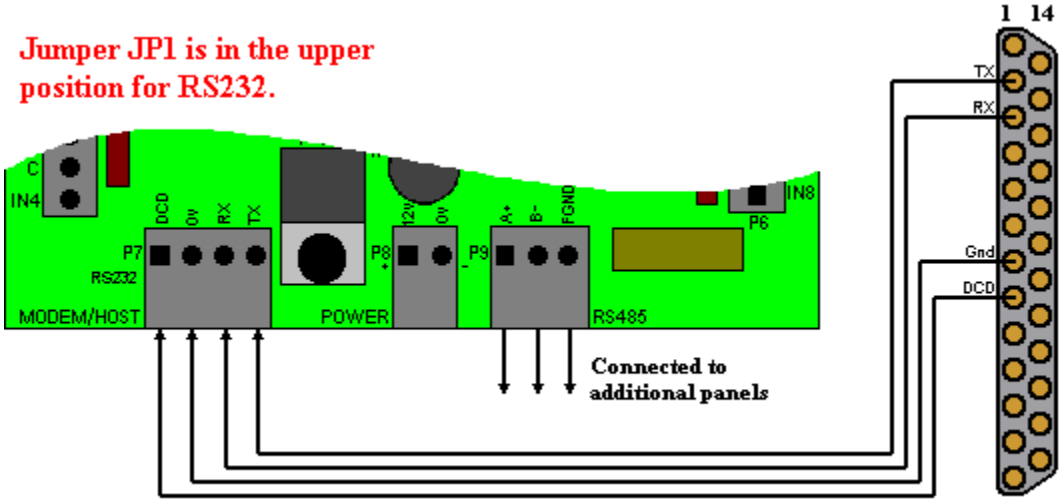
In House Hardware Setup




**Note: Panel modem side 25 pin DB connector wiring diagram is incorrect. Please refer to diagram below**

# Modem Connection

The IRC-2000 can be connected to the PC via a modem. The modem connection is similar to the RS-232 connect (*except that the TX & RX connections are straight through instead of crossed*) with the inclusion of the DCD terminal. If multiple controllers are used then the RS-485 connecter will be needed to connect the additional controllers to the modem controller.




## *Cable Specification*

4-conductor shielded, 18 to 22 AWG

## *Maximum Cable Length*

| | |
|---|---|
| 9600 baud | 150 feet (45 meters) |
| 56000 baud | 50 feet (15 meters) |